

MAMMOMAT 300

RX

Wiring Diagram

RX B7-120.051.01.08.02

Replaces:RX B7-120.051.01.07.02

English

12.95

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From serial No.	1006	1021	1056	1096	1221	1426	4001													
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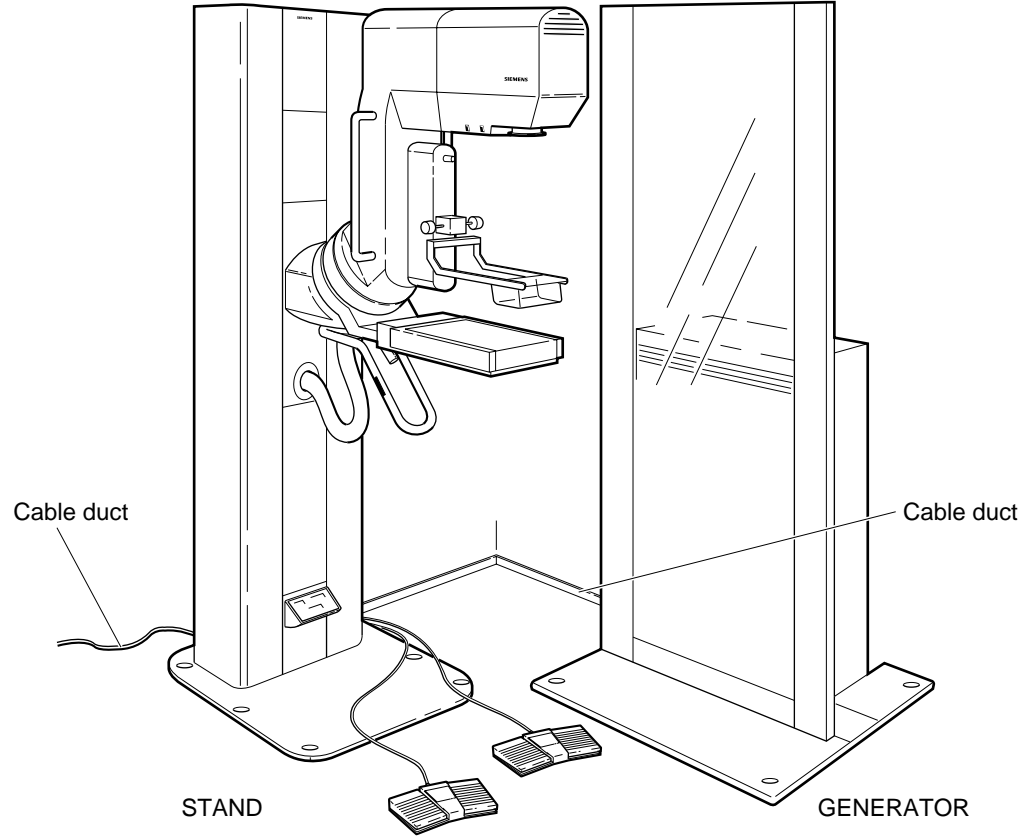
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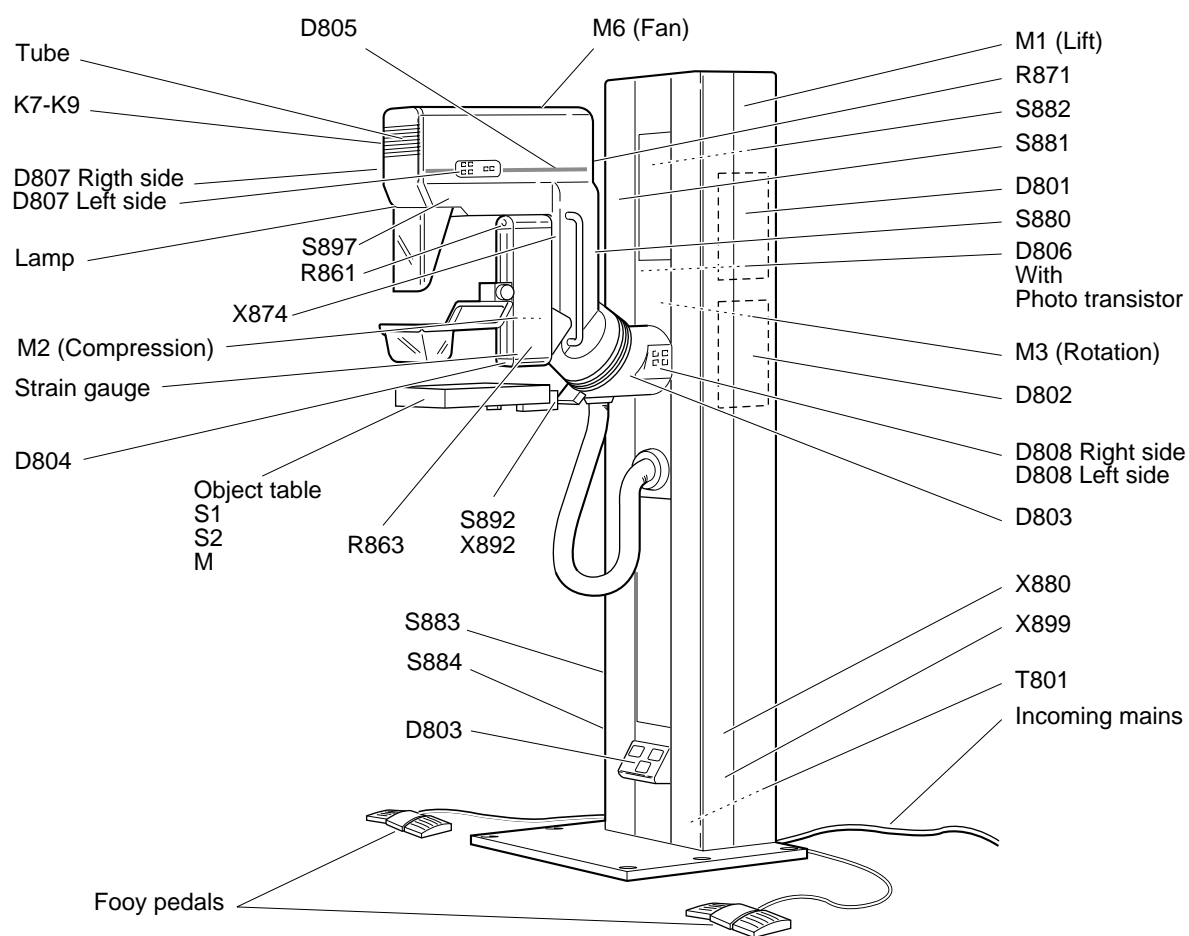
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9555 0001

PLACEMENT OF PC-BOARDS AND COMPONENTS, STAND



9555500

LIST OF BOARDS AND FUSES, STAND

PCB OVERVIEW

D801	CPU BOARD
D802	MOTOR CONTROL BOARD
D803	DISPLAY BOARD
D804	FORCE AMPLIFIER BOARD
D805	WING BOARD
D806	ANGLE DETECTOR BOARD
D807	BOARD FOR LIFT, ROTATION AND LAMP SWITCHES
D808	BOARD FOR LIFT AND ROTATION SWITCHES

FUSES OVERVIEW

PCB	FUSE	FUSED VOLTAGE
D801	F1 2 AT	+5V, +5V_REF, +5V_DSP, +7V
D801	F2 1 AT	+5V_DUEP
D802	F1 5 AT	+5V, +5V_M, +14V, D805/+5V
D802	F2 3.15 AT	+24VF, +15V
D802	F3 6.3 AT	+24V
D802	F4 4 AT	16VAC (LAMP)
D802	F5 1 AT	24VACF (FAN)

Chassis-mounted
fuses

F801 2 AT	11 VAC
F802 1 AT	11 V_DP
F803 5 AT	14 VAC
F804 5 AT	16 VAC
F805 6.3 AT	24 VAC

NOTE! See spare parts list for replacement fuses.

SWITCHES

Switch	Page	Description
S2/Object table	3-14/2A	Cassette inserted switch.
S1/D801	3-6/1D	Reset switch for stand CPU.
S1/Object table	3-14/2A	Grid out switch located in the object table.
S1-S6/D807	3-8/2A	Control switches for lamp, lift- and rotation movement. Left and right side.
S1-S4/D808	3-8/4B	Control switches for lift- and rotation movement. Left and right side.
S861	3-11/2G	Compression limit switch, compression unit.
S862	3-11/2G	Decompression limit switch, compression unit.
S880	3-4/2B	Emergency stop, switches off 24VAC and 14VAC, machine blocked.
S881	3-8/2G	Lift up limit switch, rotating unit.
S882	3-4/2A	Limit switch, distance tube head - floor <50 mm, switches off 24VAC, machine blocked.
S883	3-8/4B	Collision protection switch, risk for collision when tubehead is less than 120 mm from the floor.
S884	3-8/2G	Down limit switch, rotating unit.
S892	3-14/2C	Object table locked in position.
S897	3-13/2D	Diaphragm switch.

POTENTIOMETERS

Potentiometer	Page	Description
R803	3-12/2A	Tube angle, 2k.
R861	3-10/3E	Preset force, 10k.
R863	3-10/3E	Thickness, 2k.
R871	3-12/2A	Preset angle, 10k.

MOTORS

Motor	Page	Description
M1	3-8/2G	Lift motor.
M2	3-11/2G	Compression motor.
M3	3-8/3G	Rotation motor.
M6	3-7/4E	Fan, tube cooling.
M	3-14/2A	Grid motor

MISCELLANEOUS

Misc.	Page	Description
T801	3-3/2C	Mains transformer.
LAMP	3-13/3G	Object illumination.
R801	3-13/5F	Lamp resistor.
R807	3-8/2G	Lift motor varistor.
COMP. UNIT	3-10/2C	Compression unit.
CABLE DUCT	3-2/3A	Generator to stand cable protection
GROUND RAIL	3-2/1E	System grounding terminal
K7	3-7/4E	Fan thermostat
K8	3-7/4E	Tube temperature above normal
K9	3-7/4E	Tube temperature too high

LIST OF SIGNALS AND TESTPOINTS, STAND

Misc.	Page	Description
L801 - L809	3-8, 3-11	UHF chokes (EMC)

Page	Signal Name	Origin	Via	Destination	Testpoint	LED
3-14/2E	AEC_POS	D805		D801		
3-6/2B	AR	D801		GENERATOR	D801 AR	
3-10/3B	BR_OPEN	D804			D804.X843 pin 8	V2
3-10/3B	BR_RET	D804			D804.X843 Pin 7	
3-14/1A	CASS_LOADED	OBJ. TABLE	D805	D801		
3-11/1B	*COMP_DIR	D801		D802	D802 COMP_D	
3-10/2F	COMP_FORCE	D804		D801	D804.X843 pin 5	
3-11/1E	COMP	D802	D805	COMP. UNIT		
3-11/3E	COMP_OK	D802		D801		D802 V2 COMP_ERR
3-11/1E	COMP_PROT	D802		D801	D802	
3-11/1B	*COMP_SPEED	D801		D802	D801, D802 COMP_SP	
3-11/2D	C_PWM	D802			D802	
3-11/4F	COMPRESS	PEDAL	D805	D801, D802		
3-11/1E	DECOMP	D802	D805	COMP. UNIT		
3-11/4F	DECOMPRESS	PEDAL		D801		
3-8/2C	*DIR	D801		D802	D802	
3-8/4F	DRIVE_OK	D802		D801		D802 V12 DRIVE_ERR
3-8/1E	DRIVE_PROT	D802		D801	D802	
3-14/3B	GRID_MOTOR_N	D802	D805	OBJ. TABLE		
3-14/2A	GRID_OUT	OBJ. TABLE	D805	D801	D801 GRID_O	
3-14/2G	*GRID_SPEED	D801		D802	D801 GRID_SP	
3-10/3D	I1_OUT	D804			D804.X843 pin 6	
3-6/2B	*KVA	D801		D700 (GENERATOR)	D801	
3-13/3G	LAMP	D807	D805	D801		
3-13/4D	*LAMP_CTRL	D801		D802		
3-9/3A	LIFT_DOWN	D807, D808	D805	D801, D802		
3-9/3A	LIFT_UP	D807, D808	D805	D801, D802		
3-8/2E	L_PWM	D802			D802	
3-6/3B	MPS	D801		GENERATOR	D801	
3-7/4C	OKT1_	TUBE/K8		GENERATOR		
3-7/4C	OKT2_	TUBE/K9		GENERATOR		

*SIGNAL = "SIGNAL" active low

LIST OF SIGNALS AND TESTPOINTS, STAND

Signal Name	Description
AEC_POS	AEC-detector in position near breast. Not used in M300.
AR	Signal given to generator as exposure request. If grid used, grid has started.
BR_OPEN	Bridge open, strain gauge for compression force not working correctly.
BR_RET	Compression force strain guage return line (appr. 0V)
CASS_LOADED	Cassette inserted in object table.
*COMP_DIR	Controls compression motor to compress (moving down)
COMP_FORCE	Analog signal indicating compression force.
COMP	Power output via compression limit switch to compression motor.
COMP_OK	Compression motor working correctly, no over current.
COMP_PROT	Compression relay K1 is working correctly, checked 1s after pedal release.
*COMP_SPEED	Pulse Width Modulated signal to control speed of compression motor.
C_PWM	Pulse Width Modulated power output to compression motor.
COMPRESS	Operator control signal to move compression plate down.
DECOMP	Power output via decompression limit switch to compression motor.
DECOMPRESS	Operator control signal to move compression plate up.
*DIR	Selecting direction of rotation or lift motor.
DRIVE_OK	Rotation and lift motor are working correctly, no over current.
DRIVE_PROT	DMG relay K3 is working correctly, checked 3s after rot/lift botton is released.
GRID_MOTOR_N	Grid motor return line.
GRID_OUT	Active when the grid is not in stand by position.
*GRID_SPEED	Pulse Width Modulated signal control speed of grid motor.
I1_OUT	Output signal from compression force preamplifier.
*KVA	Signal to terminate exposure.
LAMP	Operator control signal to the field lamp.
*LAMP_CTRL	Signal to switch object illumination on.
LIFT_DOWN	Operator control signal to move compression plate down.
LIFT_UP	Operator control signal to move compression plate up.
L_PWM	Pulse Width Modulated power output to rotation or lift motor.
MPS	Multi processor serial communication for information exchange Master - Slaves.
OKT1_	Signal from temperature switch K8 on the tube.
OKT2_	Signal from the over pressure switch K9 on the tube.

LIST OF SIGNALS AND TESTPOINTS, STAND


Page	Signal Name	Origin	Via	Destination	Testpoint	LED
3-12/2D	POT_RETURN	POT		D801		
3-10/2E	PRES_FORCE	R861		D801		
3-12/1A	PRESET_ANGLE	R871	D805	D801		
3-11/2D	PU	D802			D802	
3-6/1E	*RESET	D801				
3-6/1E	*RESET_HW	D801				
3-6/1E	RESET_SW	D801				
3-9/3A	ROT_CW	D807, D808	D805	D802		
3-9/3A	ROT_CCW	D807, D808	D805	D802		
3-12/4A	ROT_POS	D806		D801		
3-6/3D	RXD	GEN.		D801	D801	
3-8/3C	*SEL_ROT	D801		D802	D802 SEL_ROT	
3-8/2C	*SPEED	D801		D802	D801, D802 SPEED	
3-13/4A	STEREO_COLL	S897		D801		
3-14/1B	TABLE_CONFIG	OBJ.TABLE	D805	D801		
3-10/3E	THICKNESS	R863		D801		
3-12/2A	TUBE_ANGLE	R803		D801		
3-6/4D	TXD	D801		GENERATOR	D801 TXD	
3-6/3B	VH	GEN.		D801		
3-10/3C	ZERO	D804			D804.X843 pin 4	

*SIGNAL" = "SIGNAL" active low


LIST OF SIGNALS AND TESTPOINTS, STAND

Signal Name	Description
POT_RETURN	Return line potentiometers connected to 0VA via a resistor.
PRES_FORCE	Analog signal as preset value for maximum compression force.
PRESET_ANGLE	Analog signal as preset value for requested rotation angle.
PU	Pull up signal for error comparators = +15V, +5V, +24V voltages OK.
*RESET	Reset signal to the CPU.
*RESET_HW	Reset signal from the CPU to the reset circuit, used for slave restart and CPU watchdog reset.
*RESET-SW	Signal from the reset switch to the CPU via the reset circuit.
ROT_CW	Operator control signal to rotate the x-ray system clockwise.
ROT_CCW	Operator control signal to rotate the x-ray system counter clockwise.
ROT_POS	Low level signal pulse indicating +10 or -10 degrees of rotation.
RXD	Input for receiving data via MPS.
*SEL_ROT	Low level signal selects the rotation drive to be controlled.
*SPEED	Pulse Width Modulated signal to control speed of rotation or lift motor.
STEREO_COLL	Diaphragm switch, diaphragm in place. For 18 x 24 or spot diaphragm.
TABLECONFIG	Inputs from object table, see configuration table.
THICKNESS	Analog signal indicating the compression thickness.
TUBE_ANGLE	Analog signal indicating the rotation angle.
TXD	Output for sending data via MPS.
VH	The stand is informed that the generator has completed its preparation.
ZERO	Used for adjusting offset of the compression force amplifiers.

LIST OF VOLTAGES AND TESTPOINTS, STAND

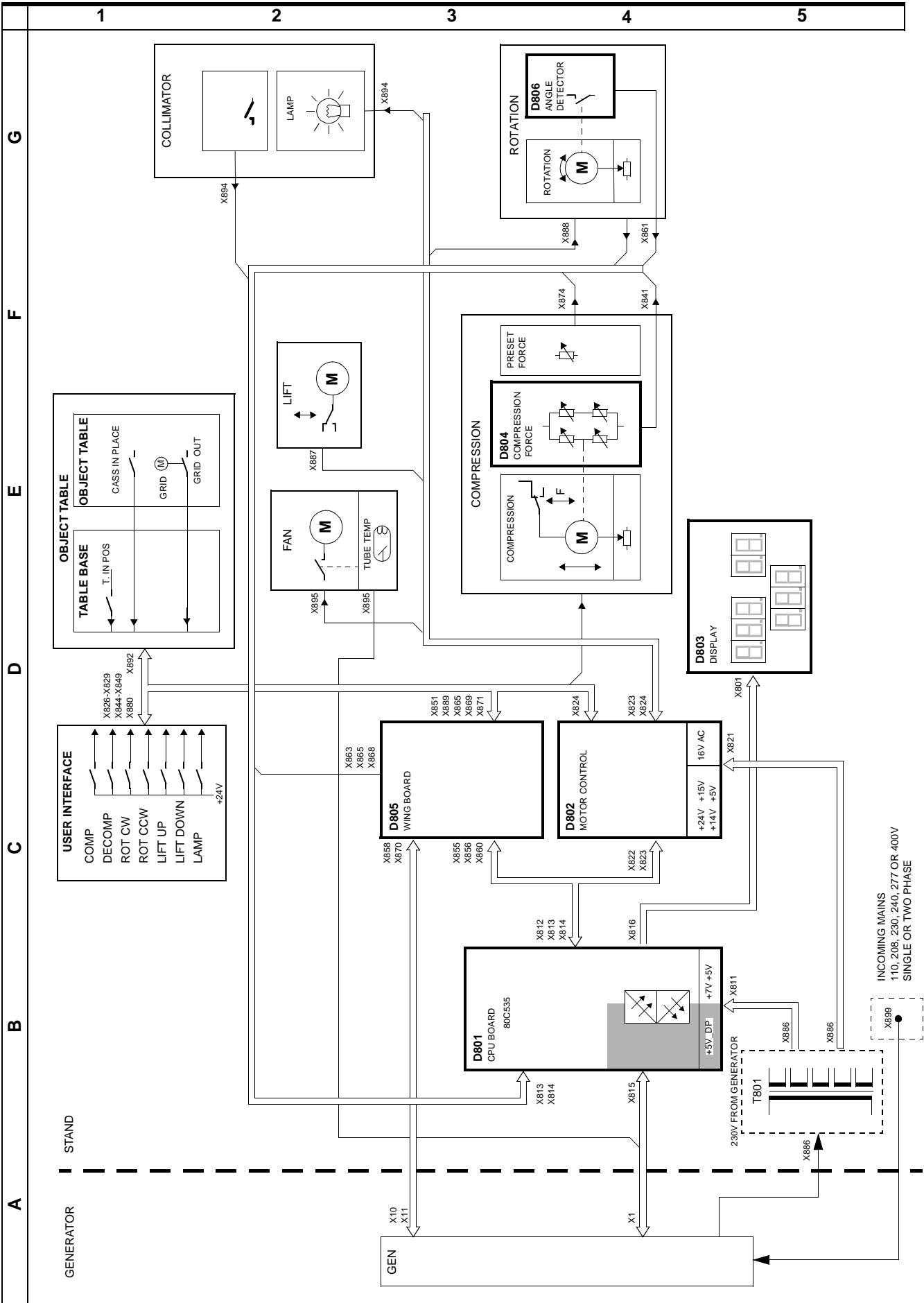
Page	Voltage	Origin	Supplied from	Supply for	Testpoint	LED	Fuse
3-3/4E	+5V	D801	11V	Digital IC, +5V_REF	5V	V7	D801/F1
3-3/4E 3-10/3B	+5V_REF	D801	+5V	Pots. D804	5V_REF X843 pin 2		D801/F1
3-3/3E	+5V_DSP	D801	11V	D803, Display	5V_DSP	V6	D801/F1
3-3/2E 3-10/3B	+7V	D801	11V	Analog IC, D804	7V X843 pin1	V5	D801/F1
3-3/3E	+5V_DP	D801	11V_DP	Generator interface	5V_DP	V8	D801/F2
3-3/3D	0VD	GND	D801/X811	Digital IC	0VD1, 0VD2		
3-3/3D 3-10/3B	0VA	0VD	D801	Analog IC D804	0VA1, 0VA2 X843 pin 3		
3-6/5D	0V_DP	D700/GND		Generator inter- face ground	0V_DP		
3-3/2C	11V	T801	230VAC	+5V, +5V_DSP, +7V			D801/F1
3-6/5B	11V_DP	T801	230VAC	+5VDP			D801/F2
3-4/3D	+5V	D802	14VAC	Digital IC	5V	V7	D802/F1
3-4/4E	+5V_M	D802	+5V	D801-D802 upto interface		V7	D802/F1
3-4/3D	+14V	D802	14VAC	+5V, D805/+5V	14V		D802/F1
3-4/2D	+15V	D802	+24V	Transistor drivers	15V	V49	D802/F2
3-4/2C	+24V	D802	24VAC	+15V, +24VF			D802/F3
3-4/2D	+24VF	D802	+24V	Switches, relays	24VF		D802/F2
3-4/3A	14VAC	T801	230VAC	+14V			D802/F1
3-13/5E	16VAC	T801	230VAC	LAMP			D802/F4
3-4/2A	24VAC	T801	230VAC				D802/F3
3-4/2E	24VACF	D802	24VAC	Fan			D802/F5
3-4/3B	0V	GND	D802/X821	Ground	0V, OV1		
3-4/2F	+5V	D805	D802/+14V	Digital IC	5V	V17	D802/F1
3-4/2G	+5V_R	D805	+5V	User switches			D802/F1
3-4/3D	+14V	D802	+24V	Switches,relays	D802/24VF		D802/F2
3-4/2D	+24VF	D802	+24V	Switches,relays	D802/24VF		D802/F2
3-3/2B	230VAC	Generator	D701/X14	Stand	X881/2,3		
3-3/1C	P.E. 	Stand X899	Inc. mains voltage	Whole system	X899/PE		
3-3/1C	N	Stand X899	Inc. mains voltage	Whole system	X899/N		
3-3/1C	L1	Stand X899	Inc. mains voltage	Whole system	X899/L1		
3-3/1C	L2	Stand X899	Inc. mains voltage	Whole system	X899/L2		
3-3/1C	L3	Stand X899			X899/L3		

LIST OF VOLTAGES AND TESTPOINTS, STAND

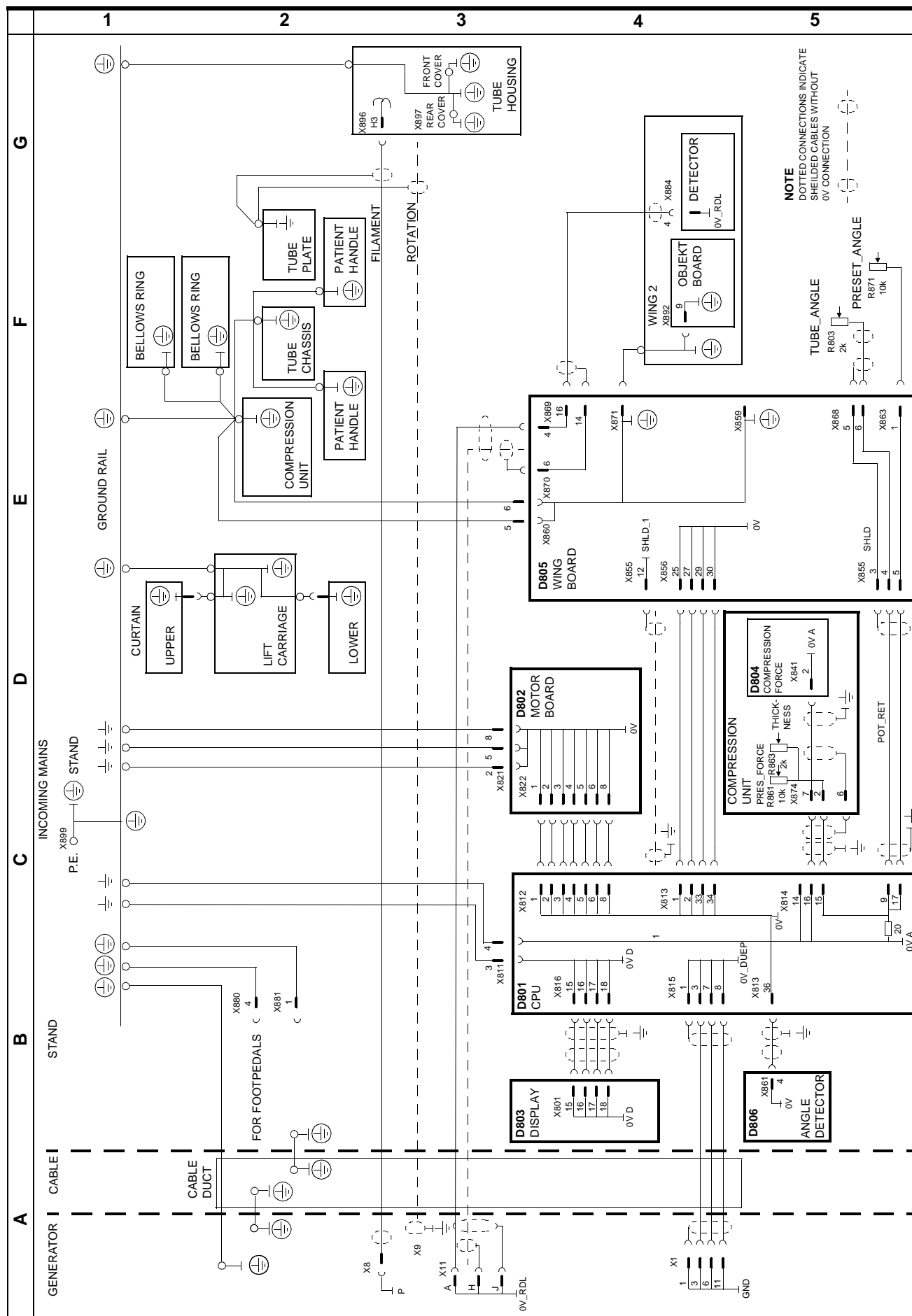
Voltage	Description (typical value)
+5V	Regulated DC voltage, 4.75V < +5V < 5.25V
+5V_REF	Regulated DC voltage, +5V -5% < +5V_REF < +5V
+5V_DSP	Regulated DC voltage, 4.75V < +5V_DSP < 5.25V
+7V	Regulated DC voltage, 6.60V<+7V<7.25V
+5V_DP	Regulated DC voltage, 4.75V < +5V_DP < 5.25V
0VD	Digital ground
0VA	Analog ground
0V_DP	Generator interface ground. Floating, grounded by generator.
11V	AC supply voltage, 11VAC ¹⁾
11V_DP	AC supply voltage, 11VAC ¹⁾
+5V	Regulated DC voltage, 4.75V < +5V < 5.25V
+5V_M	Regulated DC voltage, 4.75V < +5V_M < 5.25V
+14V	Unregulated DC voltage, 18V ¹⁾
+15V	Regulated DC voltage, 14.25V < +15V < 15.75V
+24V	Unregulated DC voltage, 32V ¹⁾
+24VF	Unregulated DC voltage, 32V ¹⁾
14VAC	AC supply voltage, 14 VAC ¹⁾
16VAC	AC supply voltage, 16 VAC ¹⁾
24VAC	AC supply voltage, 24VAC ¹⁾
24VACF	AC supply voltage for the fan
0V	Circuit ground
+5V	Regulated DC voltage, 4.75V < +5V < 5.25V
+5V_R	Regulated DC voltage, 4.40V < +5V_R < 5.25V
+14V	Unregulated DC voltage, 18V ¹⁾
+24VF	Unregulated DC voltage, 32V ¹⁾
230VAC	Stand mains voltage input, 195VAC < 230VAC < 253VAC
P.E. 	Protective earth terminal, incoming mains
N	Neutral line terminal, incoming mains
L1	Line 1 terminal, incoming mains voltage
L2	Line 2 terminal, incoming mains voltage
L3	Not used

¹⁾ STANDBY TYPICAL VALUE, 230VAC INPUT

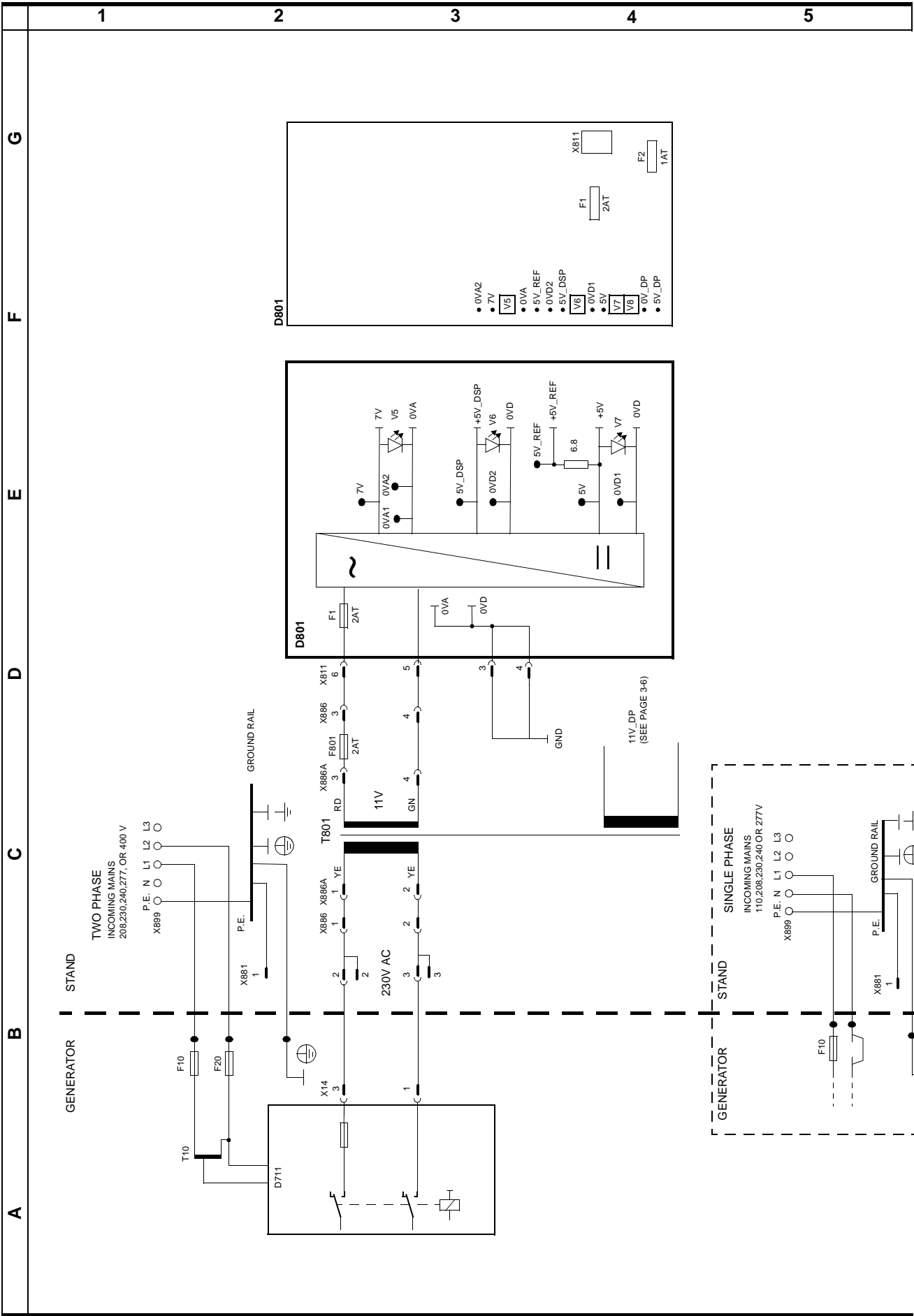
BLOCK DIAGRAM CABLE CONNECTIONS



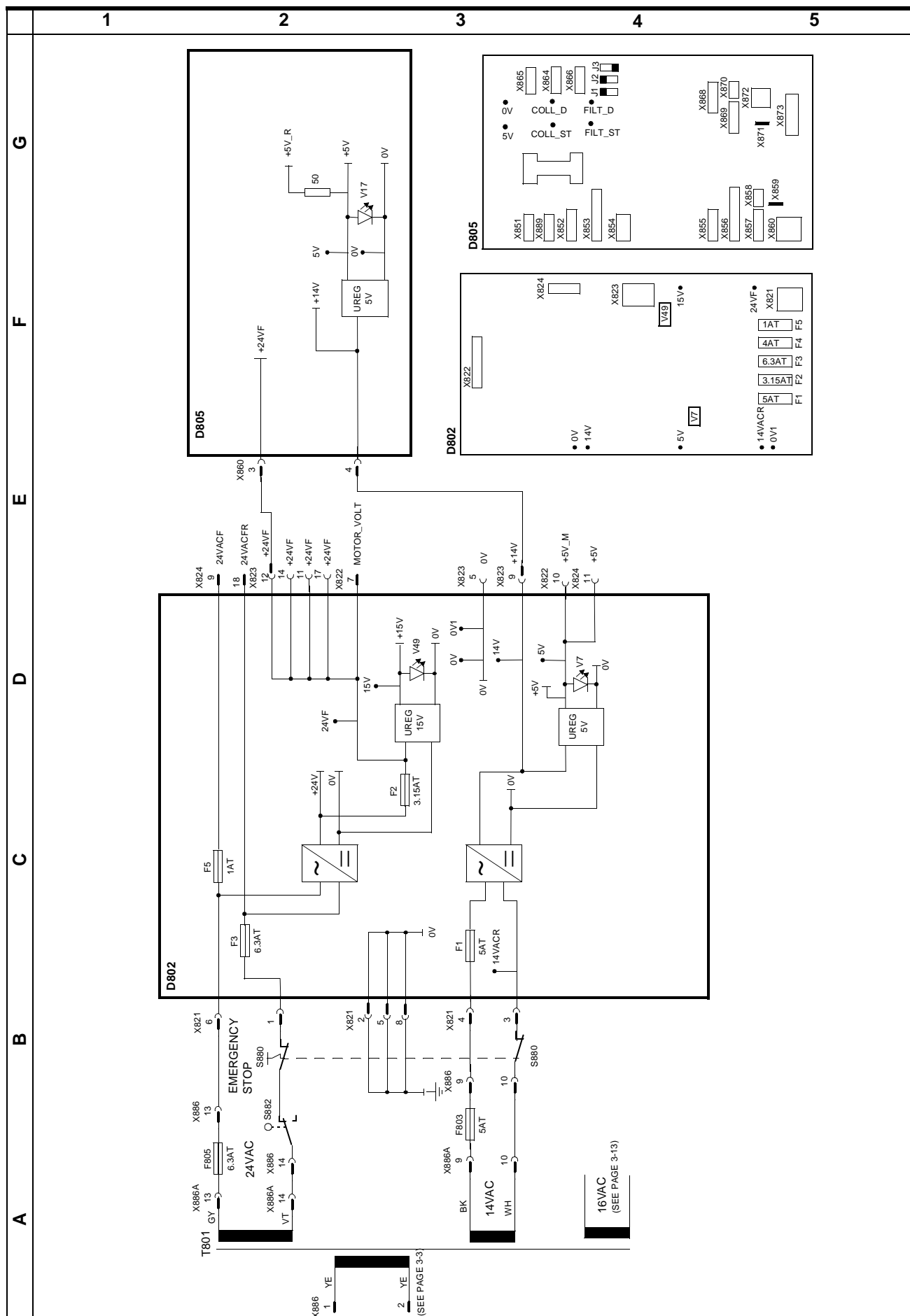
GROUNDING CONNECTIONS

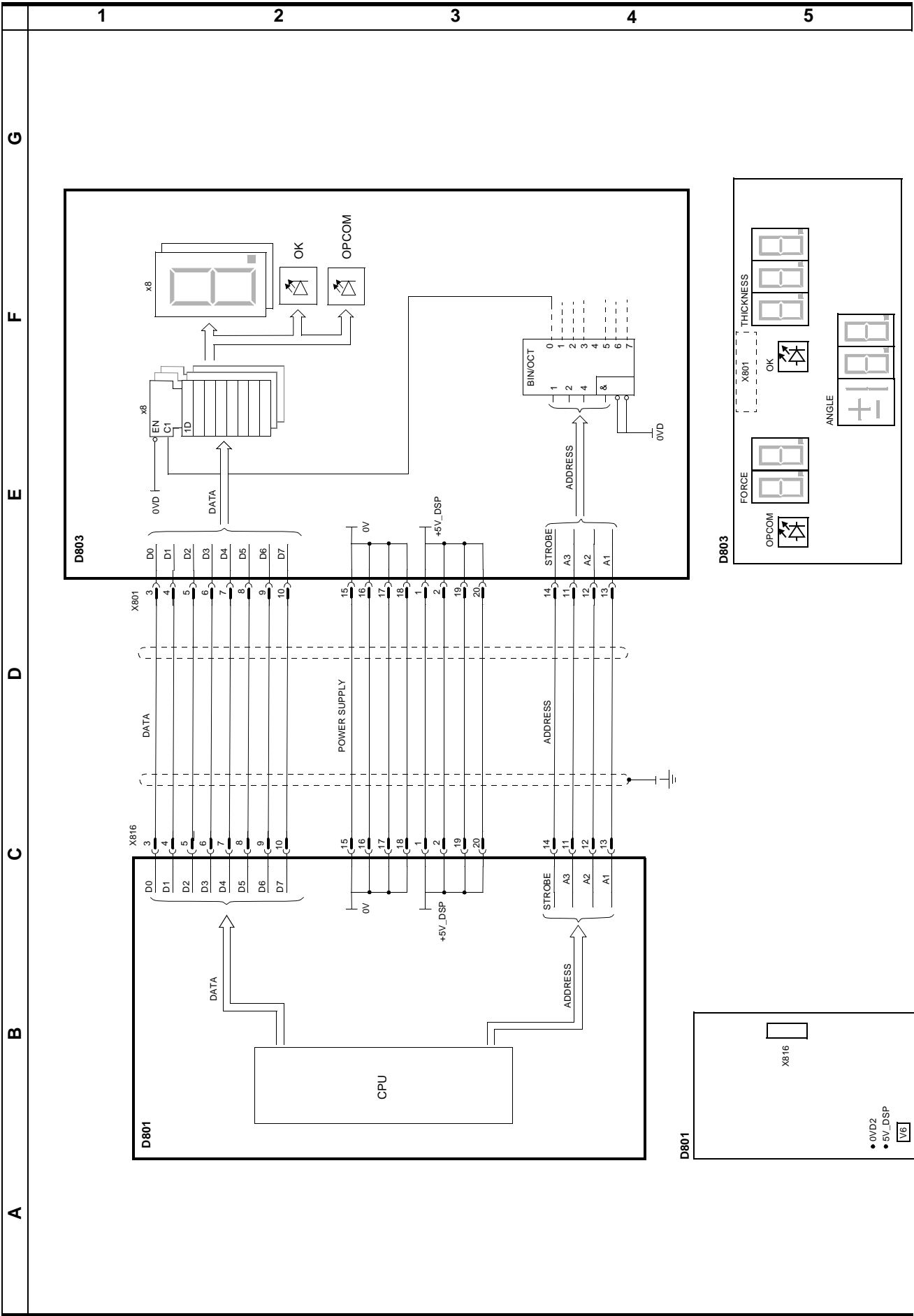


MAINS CONNECTION, POWER SUPPLY CPU

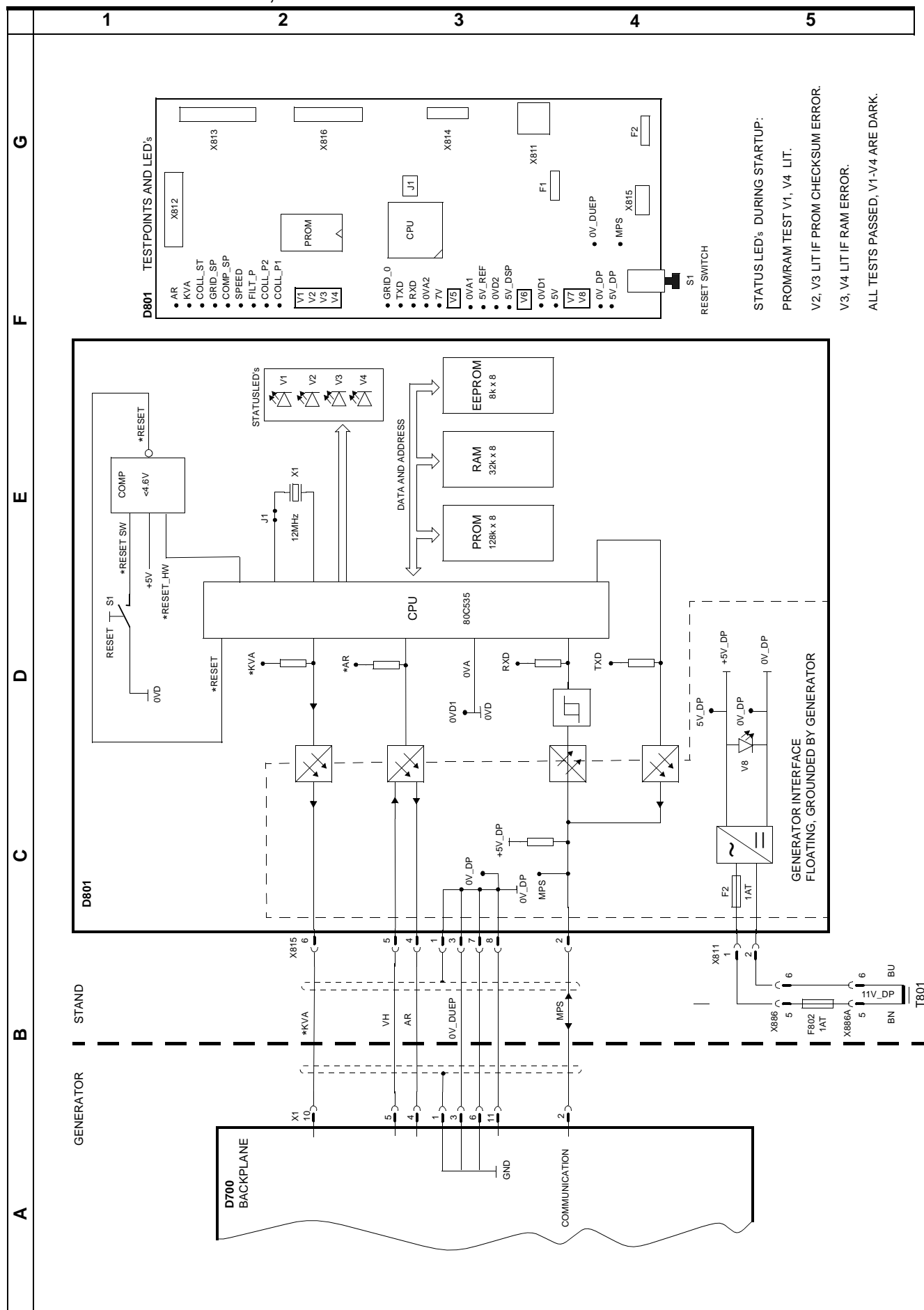


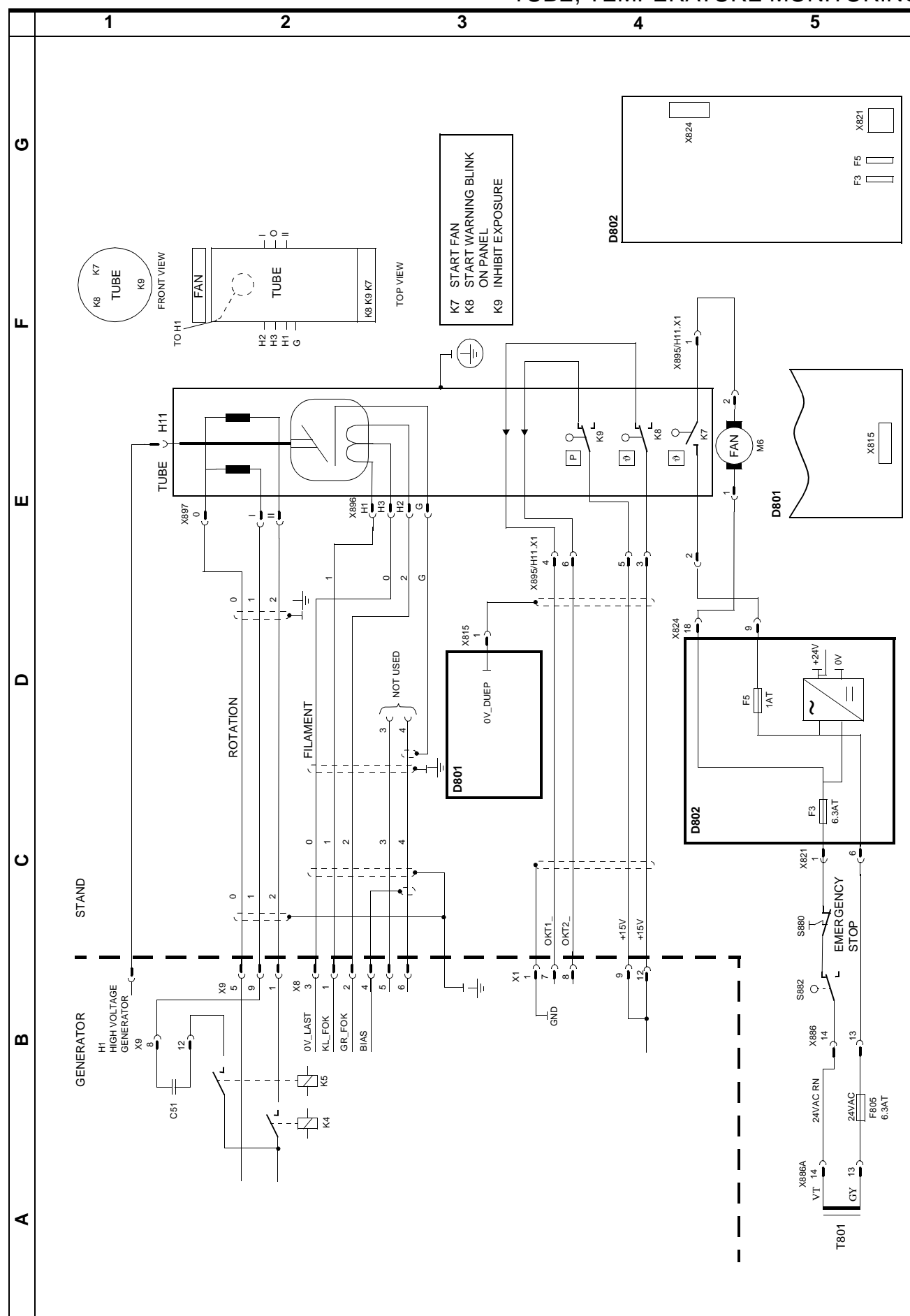
POWER SUPPLY MOTOR CONTROL



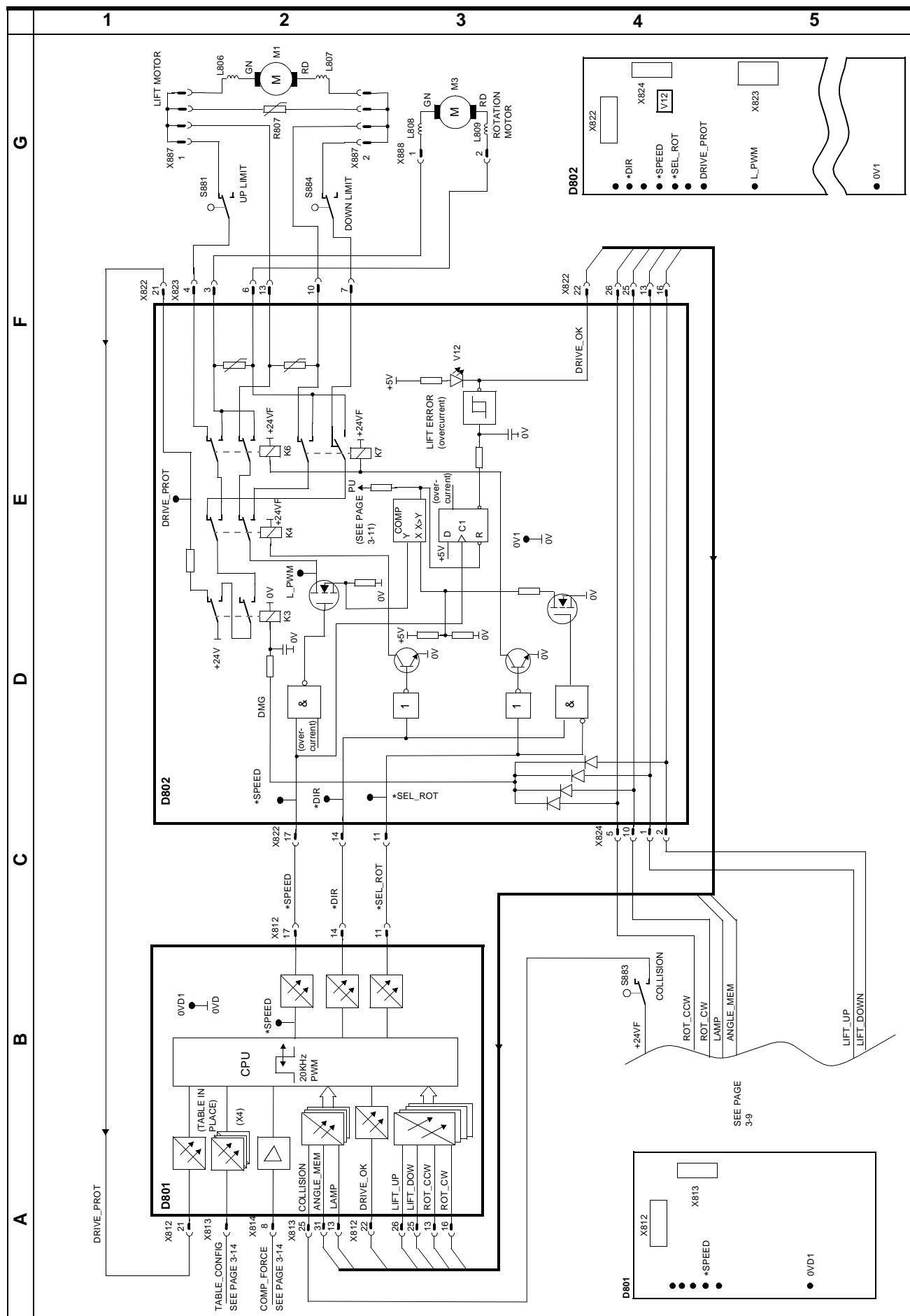


CPU BOARD INTERNAL, GENERATOR INTERFACE

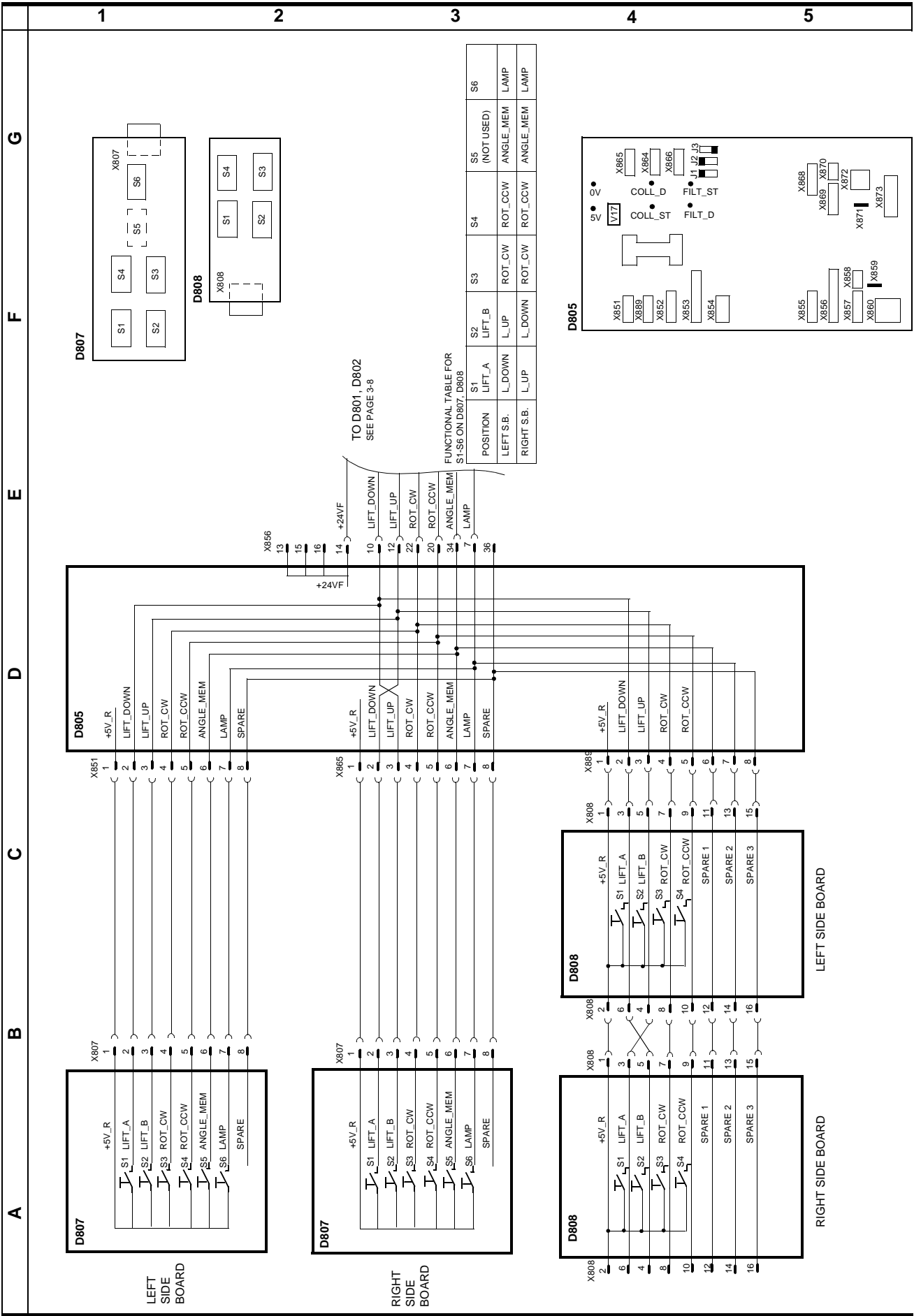




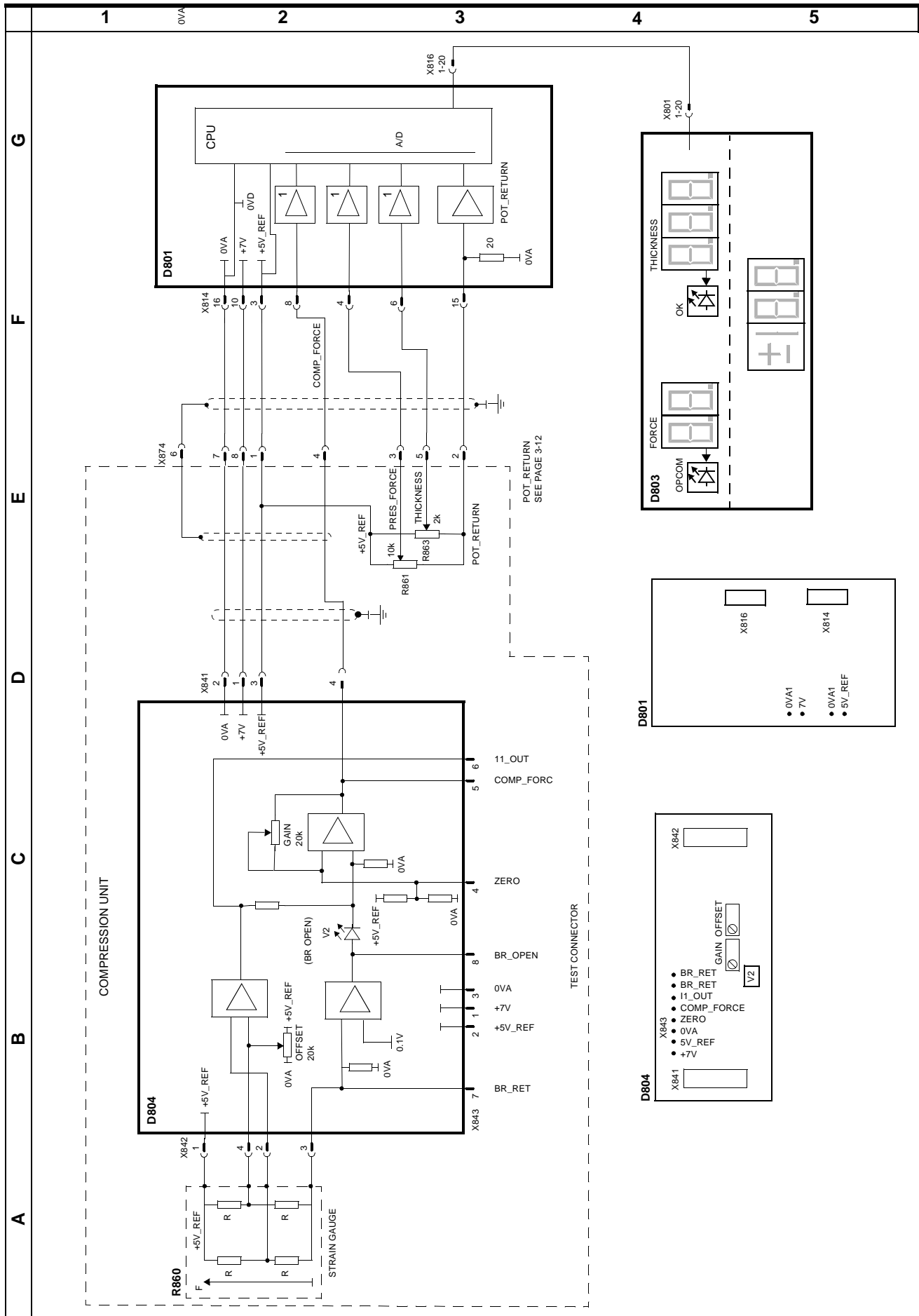
LIFT AND ROTATION MOTOR DRIVE



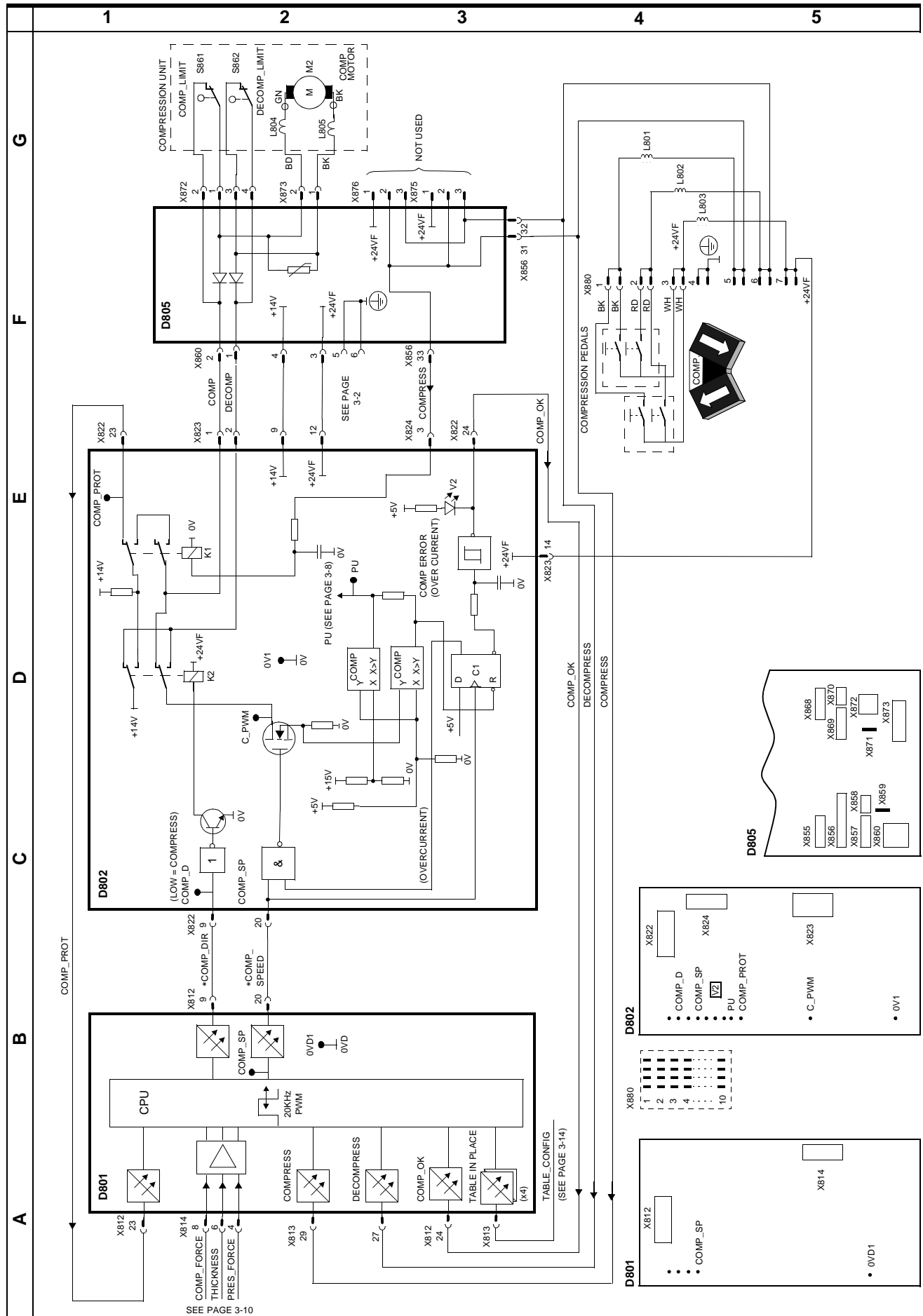
LIFT AND ROTATION SWITCHES



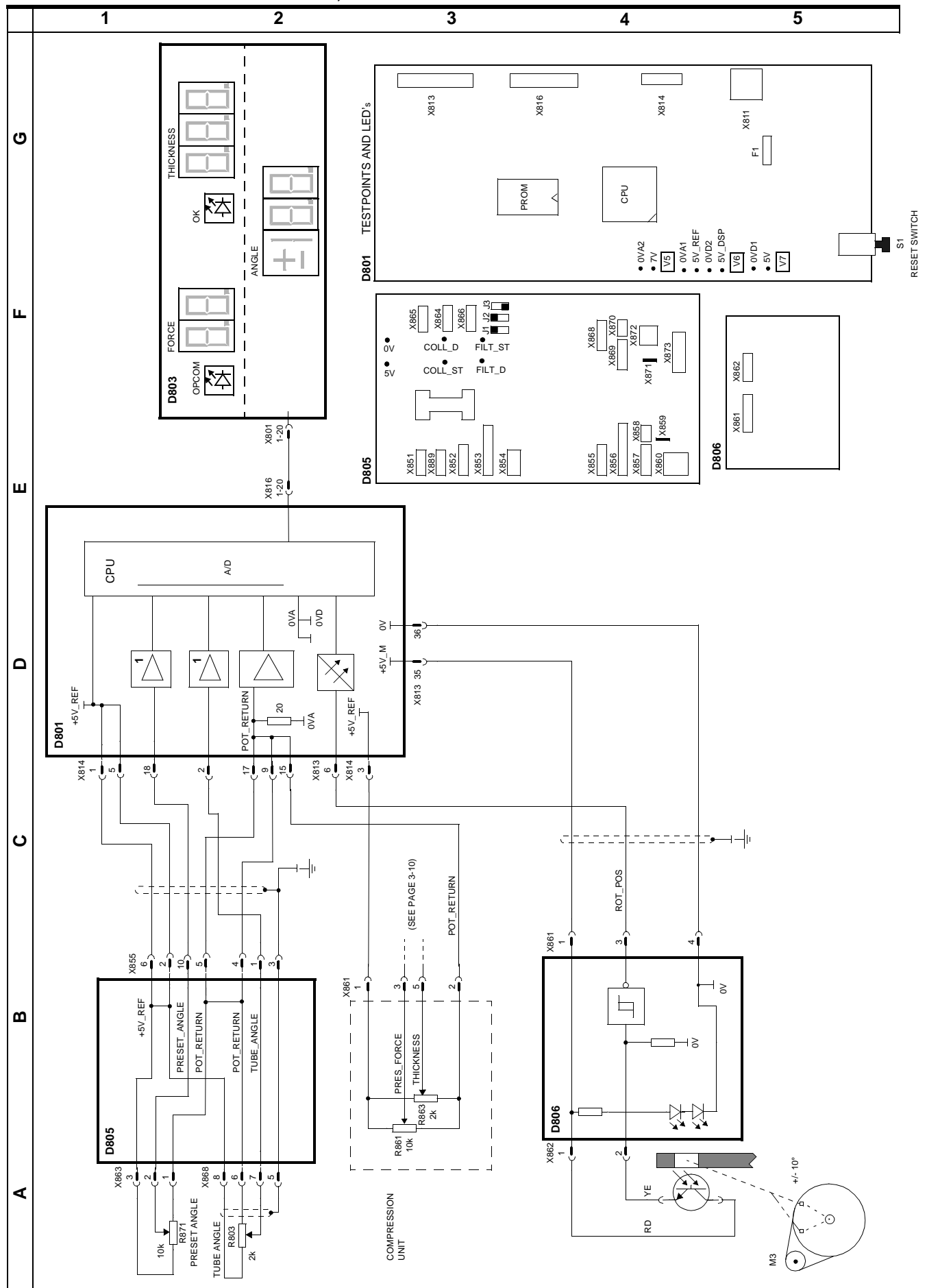
COMPRESSION MEASUREMENT SIGNALS

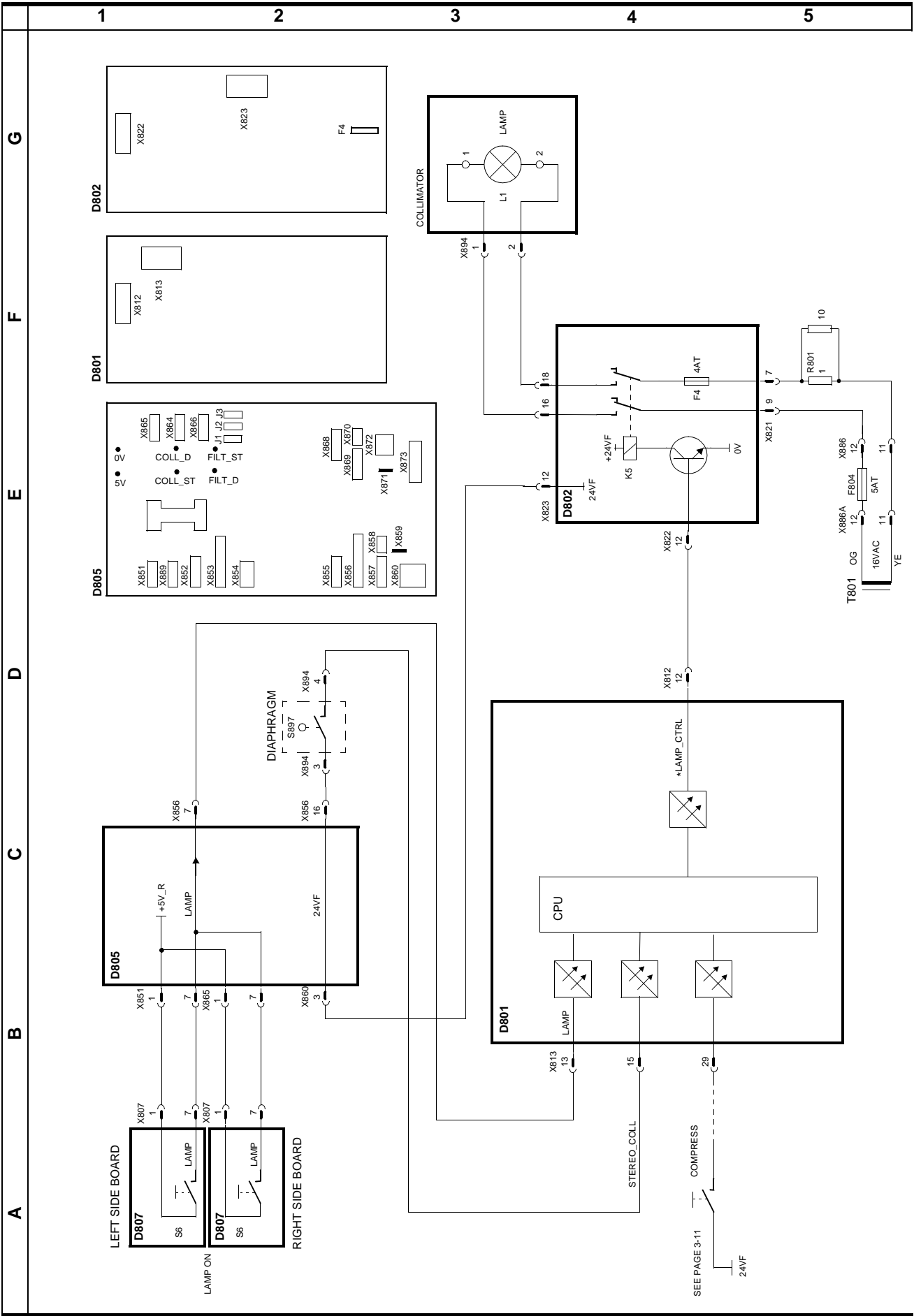


COMPRESSION MOTOR DRIVE

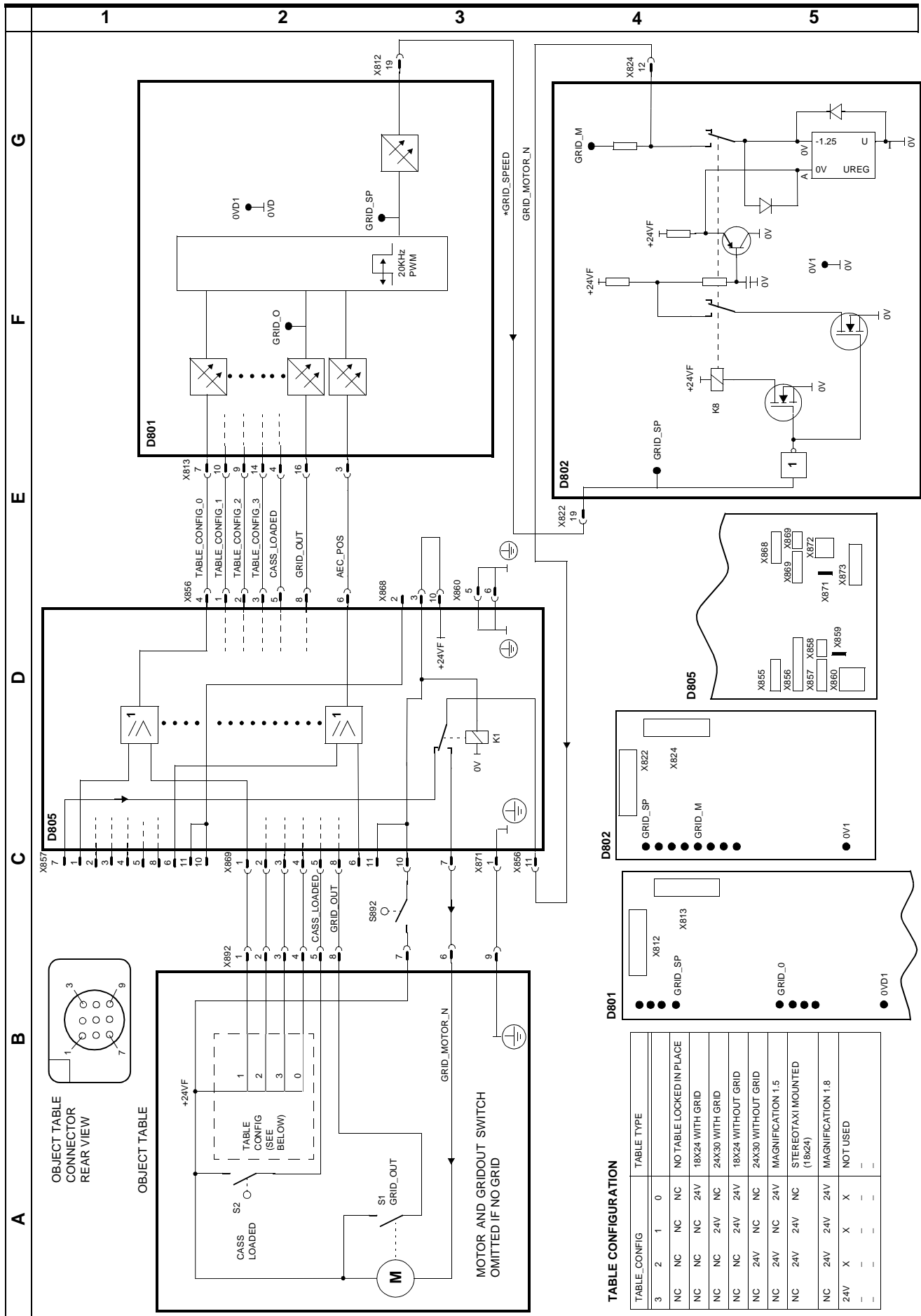


TUBE ANGLE MEASUREMENT, POT. RETURN

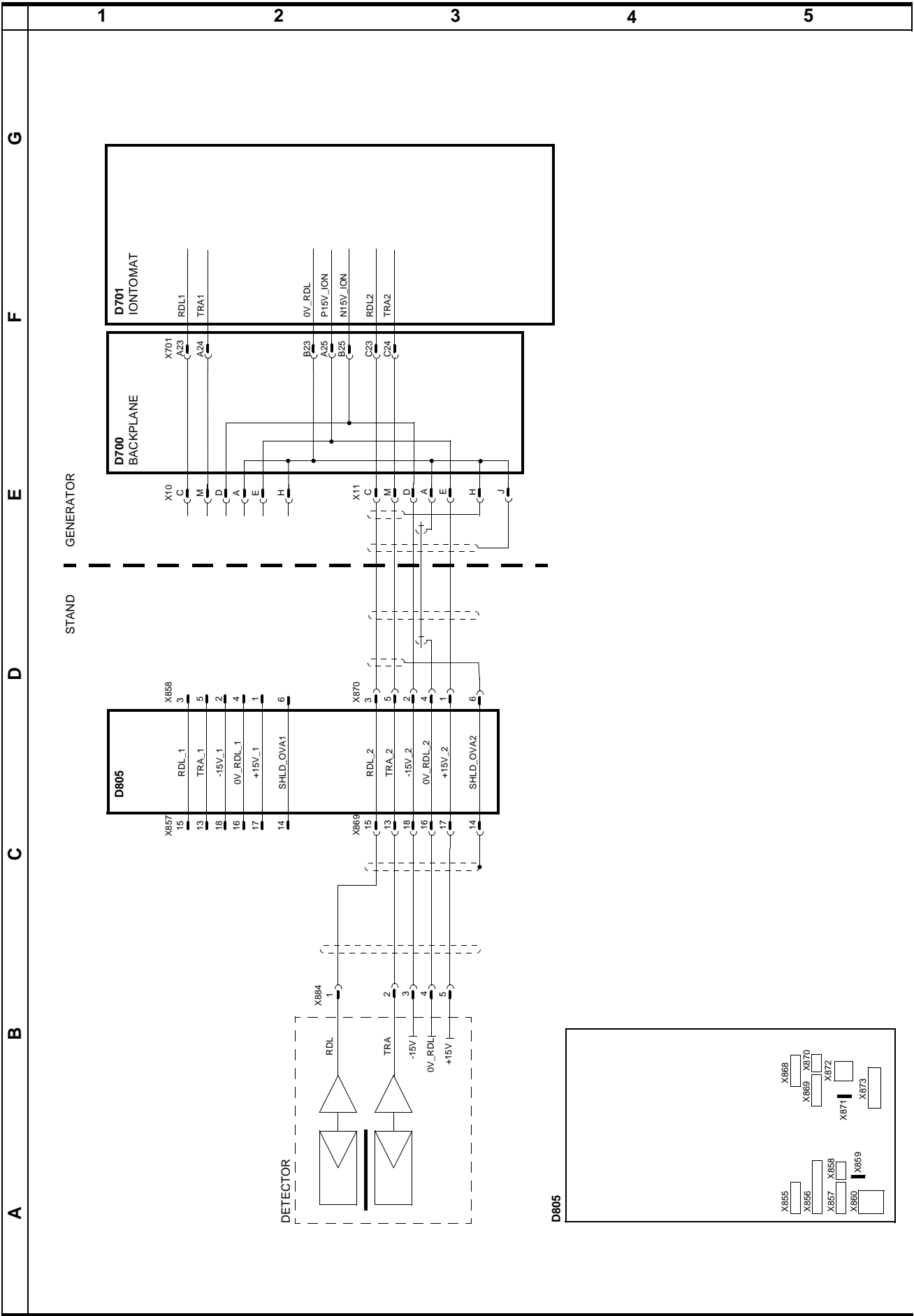




OBJECT TABLE



AUTOMATIC EXPOSURE CONTROL (AEC)



	1	2	3	4	5
G					
F					
E					
D					
C					
B					
A					

The system is factory connected for 400V 2-phase mains. For other voltages see note below and page 5-3.

Note**For 1-phase connection:**

- Move wire N/L2 from X899 L2 to X899 N (stand). Connect incoming phase to L1 and 0V to N.
- F20 in the generator must be short circuited with the jumper included in the installation kit.
- D711/F5 must be short circuited with the brass plug included in the installation kit.

For 240V mains connection:

- The fuse in position D711/F2 (4AT) shall be moved to position D711/F3. F2 shall be left open.

Caution:

When changes are made, the fuse values must be changed to the correct values with labels included in the installation kit. A triangle shall be placed adjacent to each open or short circuited fuse and shall cover any existing fuse value.

LIST OF PC-BOARDS AND COMPONENTS, GENERATOR

Subassembly and PC board overview
Baugruppen und Platinenübersicht

H1	High-voltage generator <i>Hochspannungserzeuger</i>
V1-V4	Transistor module <i>Transistormodul</i>
C51	Phase shift capacitor for rotary anode <i>Phasenschieberkondensator für Drehanode</i>
D20	Bias voltage board <i>Gitterspannungsplatine</i>
D700	Back plane board <i>Rückwand</i>
D701	Iontomat board <i>Iontomat</i>
D702	Master board <i>Master</i>
D704	Power supply board <i>Netzteil</i>
D705	Filament control board <i>Heizung</i>
D710	Inverter board (without V1-V4) <i>Wechselrichter (ohne V1-V4)</i>
D711	Power input board <i>Netzeingang</i>
D740	Control panel board <i>Bediendeck</i>
T1	Transformer for power supply <i>Transformator für Spannungsversorgung</i>
T2	Transformer for power supply <i>Transformator für Spannungsversorgung</i>
T10	Line voltage transformer <i>Netzspannungstransformator</i>
Z1	Mains filter <i>Netzfilter</i>
Z2	Mains filter <i>Netzfilter</i>
Z3	Transient protection filter

LIST OF FUSES, GENERATOR

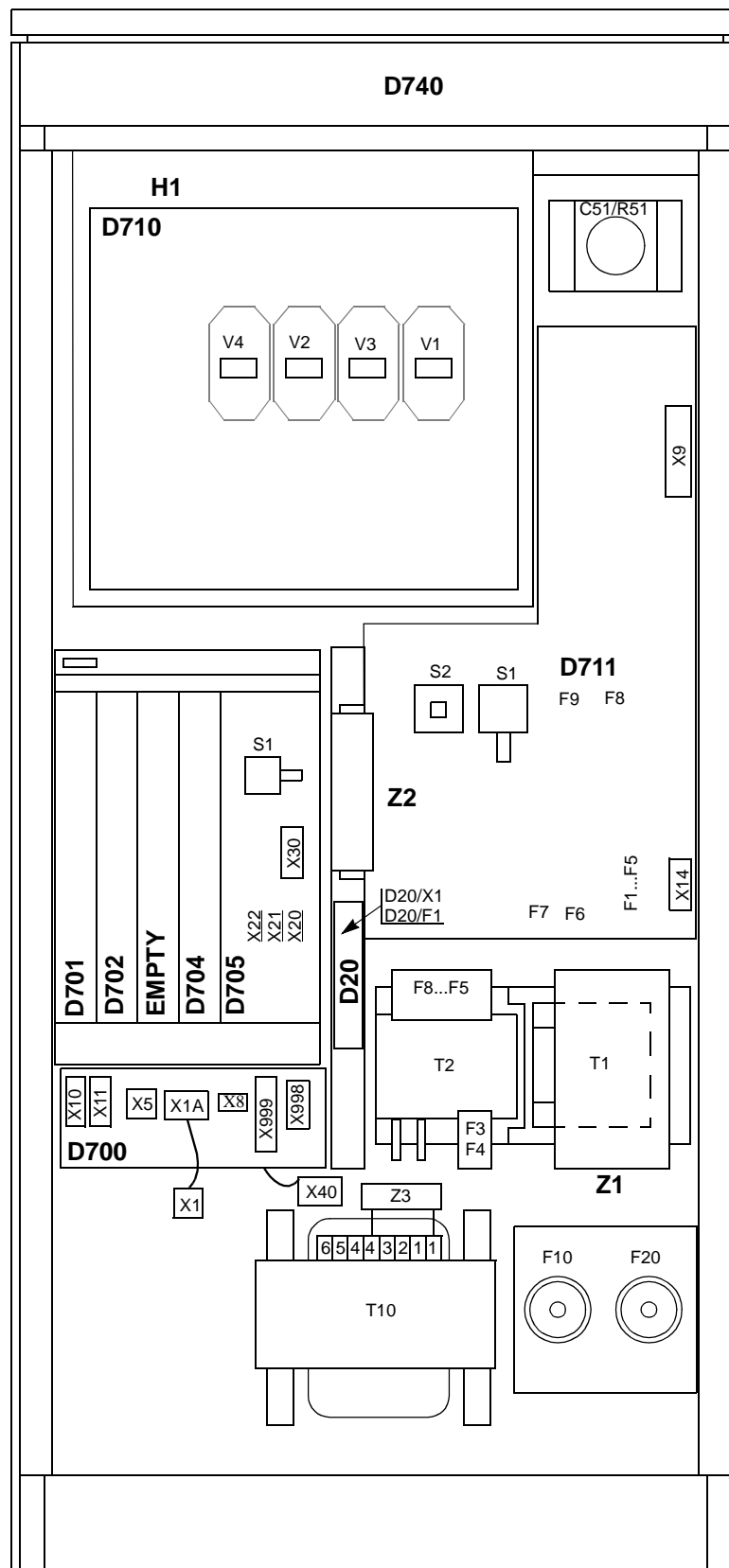
Fuses

LOCATION	FUSE		FUSED VOLTAGE
Incoming mains	F10	20 AT (35 AT) /500 V	L1 ¹⁾
Incoming mains	F20	20 AT/500 V	L2 ¹⁾
D711	F1	Not used	
D711	F2	4 AT/250 V	230V_T1 ¹⁾
D711	F3	4 AT/250 V	240V_T1 ¹⁾
D711	F4	4 AT/250 V	230V_STAND
D711	F5	4 AT/250 V	N_T1 ¹⁾
D711	F6	1.5 AT/250 V	PRIM1_T2
D711	F7	1 AT/250 V	19V_T1
D711	F8	1.5 AT/250 V	UZ
D711	F9	1.5 AT/250 V	N_UZW
T2	F3	6.25 AT/250 V	U1_HEIZ
T2	F4	0.5 AT/250 V	U2_24V
T2	F5	1 AT/250 V	U2_13V
T2	F6	1.5 AT/250 V	U2_+5V
T2	F7	1.5 AT/250 V	U2_+15V
T2	F8	1.5 AT/250 V	U2_-15V
D20	F1	0.5 AT/250 V	BIAS

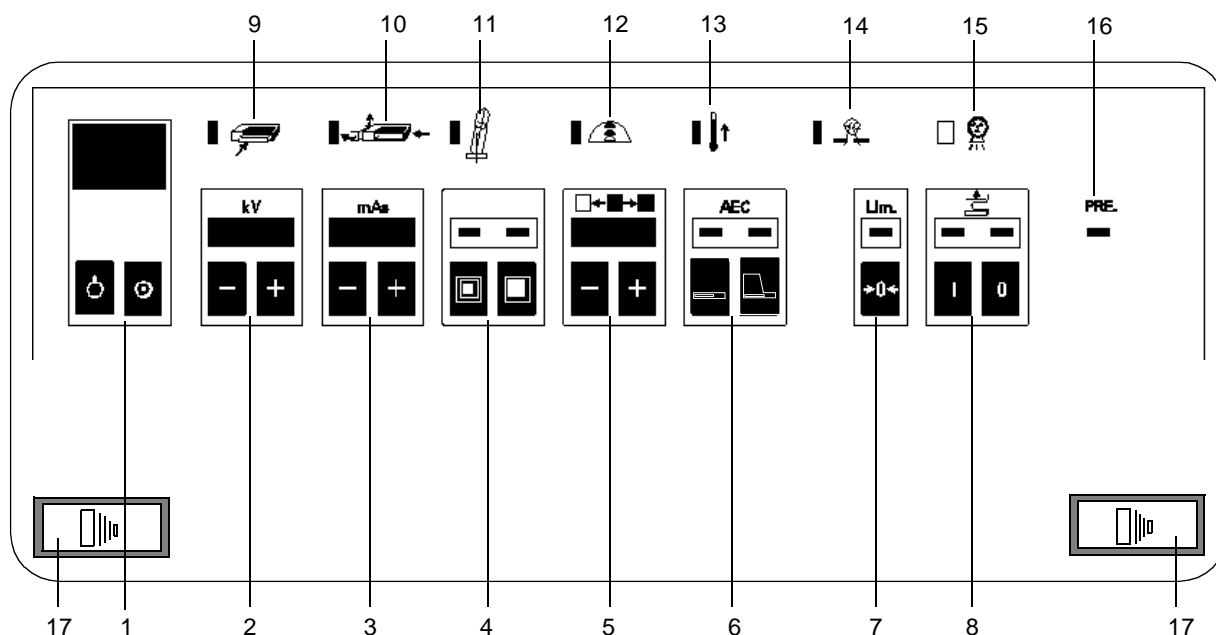
NOTE! See spare parts list for replacement fuses.

¹⁾See note on page 4-1.

PLACEMENT OF PC-BOARDS AND COMPONENTS, GENERATOR



CONTROL PANEL FUNCTIONS



- 1 Mammomat 300 ON/OFF
- 2 +/- kV selection and display
- 3 +/- mAs selection and display. In AEC mode (Automatic Exposure Control), the display remains dark before exposure. After the exposure, the mAs value reached during radiography is indicated.
- 4 Focal spot indication. Indicates focus in operation. Small focus is automatically selected, when a magnification table is used.
- 5 +/- film density adjustment and display.
- 6 AEC. These buttons are used to activate AEC mode (Automatic Exposure Control) and to select screen/film system. H stands for high speed and D for detail screens.
- 7 Limit button (acknowledgement). Serves to reset the control panel after faulty exposures, indicated by flashing limit lamp and acoustic signal (e.g. limit mAs, dose monitoring, interrupted exposure).
- 8 ON/OFF buttons to select/deselect automatic decompression after exposure. When off, use foot switch or the knobs for manual decompression.
- 9 Cassette is missing or needs to be replaced (it has already been exposed).
- 10 Object table is not locked in position.
- 11 Risk of collision between tube head and floor (limit switch is actuated).
- 12 Only for stereotactic mode (not used).
- 13 A) Flashing light: Tube temperature is above normal, but exposures can still be made.
B) Fixed light: Tube temperature is too high. Exposures cannot be made until the tube has cooled down.
- 14 External diaphragm is not in position.
- 15 Yellow light and an acoustic signal indicate radiation ON.
- 16 Green light indicates that the unit is ready for exposure. This lamp has the same function as the green lamp on the stand display.
- 17 Exposure-release buttons. Both buttons must be pressed during the entire exposure. This is to ensure that the operator is standing behind the radiation shield during the exposure.

LIST OF SWITCHES AND COMPONENTS, GENERATOR

Switches

Switch	Page	Origin	Description
S1	5-3/2G	D700	Temporary activation of the Power aid unit
S1	5-3/2F	D711	System ON (Parallell with D740/S2)
S2	5-3/2F	D711	System OFF (Parallell with D740/S1)
S1	5-5/2D	D702	UZW OFF/ON ON=Upper position
S2	5-5//2D	D702	SS OFF/ON ON=Upper position
S3	5-5/2D	D702	For service PC connection: ON= Upper position For serial printer connection: OFF=Lower position
S1	5-3/2G 5-9/1B	D740	System OFF
S2	5-3/2G 5-9/1B	D740	System ON
S27A, S27B	5-9/3A	D740	Preparation and exposure release buttons

LIST OF SWITCHES AND COMPONENTS, GENERATOR

Component overview (generator)
Bauteileübersicht (Generator)

Component	Page	Origin	Description
K1	5-6/1F	D20	Connects bias voltage to tube
K2	5-6/1F	D20	Bias voltage monitoring
K8	5-10/3F	D701	Iontomat software controlled drift measurement (NOT USED) <i>Iontomat Software gesteuerte Drift Messung (NOT USED)</i>
K1	5-6/3F	D705	Small/large focus changeover <i>Umschalten kleiner/großer Fokus</i>
K2	5-7/2D	D705	Inverter frequency changeover <i>Umschalten der Wechselrichterfrequenz</i>
K3	5-7/3D	D705	Control for brakes <i>Ansteuerung für Bremsen</i>
K1	5-8/3E	D710	SS relay <i>SS-Relais</i>
K2	5-8/1C	D711	By-passes intermediate circuit charging resistors <i>Überbrückt Zwischenkreis Ladewiderstände</i>
K3	5-3/2E	D711	Switches on generator and stand <i>Schaltet Generator und Stativ ein</i>
K4	5-8/3F	D711	Starting rotary anode <i>Anlauf Drehanode</i>
K5	5-8/3F	D711	Starting and braking, rotary anode <i>Anlauf und Bremsen Drehanode</i>
K6	5-3/2E	D711	System ON <i>System EIN</i>
K7	5-3/2F	D711	System supply OFF <i>System AUS</i>
K8	5-6/3C	D711	Filament intermediate circuit ON <i>Heizungs-Zwischenkreis EIN</i>
K9	5-6/3C	D711	By-passes charging resistors of the heating <i>Überbrückt Ladewiderstände Heizung</i>
K10	5-3/2E	D711	Switches on P24V <i>Schaltet Trafo P24V ein</i>
K11	5-8/1B	D711	Intermediate circuit ON <i>Zwischenkreis EIN</i>
K12	5-8/1B	D711	Intermediate circuit ON <i>Zwischenkreis EIN</i>
L701-L702	5-9/3A	D740	UHF chokes (EMC)

LIST OF SIGNALS AND TESTPOINTS, GENERATOR

Page	Signal name	Origin		Destination	Testpoint	LED
5-5/2E 5-7/3E	ANST2_	X702.B16	=>	X705.B15		
5-5/2C	AR	X1.4 STAND	=>	X702.C13		D702.V2.GN
5-5/3E 5-7/1B	BRAKE_	X702.C8	=>	X705.C6	D705.X717	D702.V4.GN
5-5/1E	BS_	X702.B8	=>	D711.X3.12	D702.X984.BS	
5-7/4E	CNT	X705.A11	=>	X702.A13	D702.X966.CNT	
5-5/1E	DS_	X702.C7	=>	D711.X3.13	D702.X982.DS	
5-5/2E	FOKUS_	X702.B10	=>	X705.B8		
5-5/3E	IHREG	X702.A11	=>	X705.A9	D702.X968.IHREG	
5-5/4F 5-6/4B	IHSOLL	X702.C23	=>	X705.C27	D705.X705 IHref. 1V=1A	
5-5/4C 5-6/3B	IHIST	X705.C28	=>	X702.C24	D705.X704 IHact. 1V=1A	
5-7/2E	IMAX_WR	D710.X2.10	=>	X705.C12		D705.V40.GE WR _{AUSTAST}
5-7/4E	ISCHWING1	D710.X2.18	=>	X705.A12	D705.X710 I Swing 1V=10A	
5-5/4E 5-7/1B	KVA_		X701.C9X 702.C9X70 5.C7		D705.X715	
5-5/3E 5-7/1B	KVE_	X702.B9	=>	X701.B9 X705.B15	D705.X714	D702.V3.GN
5-7/3C	KVIST	D710.X73	=> X702.A24	X705.B11	D705.X711 kVact. 1V = 5kV	

"SIGNAL_" = "SIGNAL" is active low

LIST OF SIGNALS AND TESTPOINTS, GENERATOR

Signal name	Explanations
ANST2	Blocks V2 and V3 of the inverter at braking. <i>Blockiert V2 und V3 des Wechselrichters beim Bremsen.</i>
AR	Signal given to generator as exposure request. If grid used, grid has started. <i>Rasterkontrakt vom Aufnahmetisch zum Einschalten der Aufnahme.</i>
BRAKE_	Anode braking after exposure end. <i>Abbremsen der Drehanode nach dem Ende der Aufnahme.</i>
BS_	Controls the relay K5 on D711 for braking. K5 is also energized at boost of anode rotation. <i>Steuert Relais K5 auf D711 an zum Abbremsen. K5 ist aber auch beim Anlauf der Drehanode angesteuert.</i>
CNT	Enables the MASTER to count the periods of the inverter at anode rotation boost. <i>Ermöglicht dem MASTER das Zählen der Schwingungen des Wechselrichters beim Hochlauf.</i>
DS_	Controls the relay K4 on D711 to start anode rotation boost. <i>Steuert Relais K4 auf D711 an zum Anlassen der Drehanode.</i>
FOKUS_	Controls the relay K1 on D705 to select, large focus. <i>Steuert Relais K1 auf D705 an zur Auswahl, großer Fokus.</i>
IHREG	Turns the filament regulator on. The regulator is on at standby, preparation and exposure, i.e. always after the power-on initialisation of the generator. <i>Schaltet den Heizungsregler ein. Der Regler ist EIN in STANDBY, Vorbereitung und Aufnahme, das heißt immer, wenn der Generator initialisiert hat.</i>
IHSOLL	The reference value for the filament current is given from the MASTER to the regulator. <i>Der Heizstrom - Sollwert wird vom MASTER zum Regler gegeben.</i>
IHIST	The actual value for the filament current can be read by the MASTER. <i>Der Heizstrom - Istwert kann vom MASTER gelesen werden.</i>
IMAX_WR	The maximum current of one of the 4 POWER MOS-FET modules is exceeded. <i>Der maximale Strom von einem der 4 POWER MOS-FET in dem Wechselrichter ist überschritten.</i>
ISCHWING1	The output current in the inverter is measured at anode rotation boost, exposure and braking. <i>Der Schwingstrom im Wechselrichter wird gemessen bei Hochlauf, Aufnahme, Bremsen.</i>
KVA_	WIRED-OR line is "1" during the exposure and can be pulled to "0" at any time during the exposure by D701 or D702, or D705. During the anode rotation boost, exposure, braking the KVA signal is "1" to enable the inverter. ATTENTION: The signal is inverted at measuring point D705.X715 <i>WIRED-OR Leitung ist "1" während der Aufnahme und kann jederzeit von D701 oder D702 oder D705 "0" gezogen werden zum Abschalten der Aufnahme. Während Hochlauf, Aufnahme, Bremsen ist KVA "H" damit der Wechselrichter freigegeben ist.</i> <i>ACHTUNG: Am Meßpunkt D705. X715 ist das Signal invertiert.</i>
KVE_	Output signal from the MASTER start the exposure. <i>Signal ausgegeben von MASTER zum Einschalten der Aufnahme.</i>
KVIST	The kVactual value is given by the D710 to the MASTER and to the regulator D705. <i>Der kVist Wert wird vom D710 zum MASTER gegeben und zum Regler D705.</i>

LIST OF SIGNALS AND TESTPOINTS, GENERATOR

Page	Signal name	Origin		Destination	Testpoint	LED
5-5/4F 5-7/2B	KVSOLL	X702.A23	=>	X705.A27	D705.X712 kVref. 1V = 5kV	
5-5/3C 5-7/3D 5-10/1C	KV>17	X705.B10	=>	X702.B12		D705.V39.GE
5-5/3C 5-7/4E	KV>50	X705.C10	=>	X702.C12		D705.V41.GE
5-6/5B	MAIST	D710.X2.22	=>	X705.B28	D705.X707 mAact. 1V = 40mA	
5-5/5C 5-6/4B	MAIST_CAL	X705.B29	=>	X702.B25		
5-5/3E 5-6/4B	MAREG	X702.B11	=>	X705.B9	D702.X969.MAREG	
5-5/4F 5-6/4B	MASOLL	X.702.B23	=>	X705.B27	D705.X706 mAref. 1V=40mA	
5-5/5F	MPS	MASTER: X702.A17(Master) <=> SLAVES: X5.7 (Control Panel) X701.A17 (lontomat) X1.2 (stand)				
5-5/2E	NSE1_	X702.A7	=>	X711.X3.11	D702.X980	
5-5/1E	NSE 2_	X702.B7	=>	D711.X3.7	D702.X981	
5-5/1C	OKT_1_	X1.7 GERÄT	=>	X702.A15		
5-5/1C	OKT_2_	X1.8 GERÄT	=>	X702.B15		
5-5/2C	PH1_	D710.X2.2	=>	X702.A14		
5-10/4D 5-10/4D	RDL_1 RDL_2	X10.C X11.C	=>	X701.A23 X701.C23	D701.X341 (RDL)	
5-5/3E 5-7/4B	RESET_FF	X702.C11	=>	X705.C9		
5-5/2E 5-7/2E	SS_	X702.A8	=>	X705.A6 D710.X6.1	D702.X983	

"SIGNAL_" = "SIGNAL" is active low

LIST OF SIGNALS AND TESTPOINTS, GENERATOR

Signal name	Explanations
KVSOLL	The kVreference value is given by the MASTER to the regulator D705. <i>Der kVsoll Wert wird vom MASTER zum Regler D705 gegeben.</i>
KV>17	As soon as kVactual value exceeds 17kV, this will be considered as "X-Ray on" and is reported to the MASTER. <i>Sobald kVist 17 kV überschritten hat, wird dies als "Strahlung vorhanden" bewertet und dem MASTER gemeldet.</i>
KV>50	If kVactual value exceeds 50 kV this is considered as a fault and latched on the D705 in a FLIP-FLOP. <i>Überschreitet kVist 50 kV so wird dies als Fehler bewertet und auf der D705 in einem FLIP-FLOP gespeichert.</i>
MAIST	The actual value of the tube current is given to the regulator D705. <i>Der mA ist wert wird zum Regler D705 gegeben.</i>
MAIST_CAL	This value is fed to the MASTER and it calculates the mAs-product for exposure termination, when the requested mAs are reached. For Iontomat mode the mAs product is calculated. <i>Dieser Wert wird dem MASTER zugeführt und dieser bildet daraus das mAs-Produkt zum Abschalten wenn die gewünschten mAs erreicht wurden, respektiv zur mAs-Nachanzeige bei Iontomat Betrieb.</i>
MAREG	If X-rays are present, an tube current regulator is additionally connected to the filament regulator. <i>Sobald Strahlung vorhanden ist, wird dem Heizstromregler noch zuzätzlich der Röhrenstromregler aufgeschaltet.</i>
MASOLL	The reference value for mA is given from the Master to the regulator D705. <i>Der mA-Sollwert wird vom Master zum Regler D705 gegeben.</i>
MPS	Multi processor serial communication interface. For information exchange Master-Slaves. <i>Serieller Datenaustausch Master-Slave.</i>
NSE1_	Power-on of the intermediate voltage UZ by relays K11 and K12 through damping resistors. <i>Einschalten der Zwischenkreisspannung UZ durch Relais K11 und K12 über Dämpfungswiderstände.</i>
NSE 2_	Controls the relay D711. K2, bypassing the damping resistors. <i>Steuert das Relais D711. K2, welches die Dämpfungswiderstände überbrückt.</i>
OKT_1_	Overtemperature of the tube housing is announced to the MASTER. <i>Übertemp. Strahlergehäuse wird dem MASTER gemeldet.</i>
OKT_2_	Overpressure of the tube housing is announced to the MASTER. In serial with door switch and bias voltage monitoring. (D20). <i>Überdruck im Strahlergehäuse wird dem MASTER gemeldet.</i>
PH1_	Overpressure of the HT generator tank is announced to the MASTER. <i>Überdruck Hochspannungstrafo wird dem MASTER gemeldet.</i>
RDL_1 RDL_2	Power of dose signal, comes from the double detector, is only used on board D701. (RDL_1 not used). <i>Signal Dosisleistung, kommt vom Doppeldetektor, wird nur auf der D701 Platine verarbeitet.</i>
RESET_FF	Reset of the fault latching flip-flop kV>50 by the MASTER. <i>Zurücksetzen des Fehlerspeicher - FLIP-FLOP kV>50 durch den MASTER</i>
SS_	On board D705 the relay K2 switches the frequency to ROT - ANODE 160Hz. On board D710 the relay K1 disconnects the H. V. transformer. <i>Auf D705 schaltet K2 die Frequenz um auf Rot - Anode 160Hz. Auf D710 schaltet K1 den Hochspannungstrafo ab.</i>

LIST OF SIGNALS AND TESTPOINTS, GENERATOR

Page	Signal name	Origin		Destination	Testpoint	LED
5-10/5D 5-10/5D	TRA_1 TRA_2	X10.M X11.M	=>	X701.A24 X701.C24	D701.X342 (TRA)	
5-5/2C 5-7/5E	U_ANST_	D710.X2.26	=>	X702.A18		
5-8/1F	UZIST	D710.X2.8	=>	X702.A29 X705.A25	D705.X713 UZ IST 1V = 50V	D710.V24.RT
5-5/2C	VH	X702.B13	=>	X1.5 GERÄT	D702.X967.VH	
5-5/3E 5-6/4B	WENDEL_	X702.A10	=>	X705.A8		
5-7/3E	WR_ANST1	X705.A13	=>	D710.X6.14		
5-7/3E	WR_ANST2	X705.B13	=>	D710.X6.15		
5-5/2C 5-7/1E	WR_AUSTAST_	X705.A10	=>	X702.A12		D705.V40.GE
5-5/3E 5-7/1B	ZBL_	X702.A9	=>	X705.A7	D705.X716	D702.V1.GN
5-5/2E 5-6/3B	ZK_HEIZ1_	X702.C10	=>	D711.X3.1		
5-5/2E 5-6/3B	ZK_HEIZ2_	X702.A16	=>	D711.X3.4		

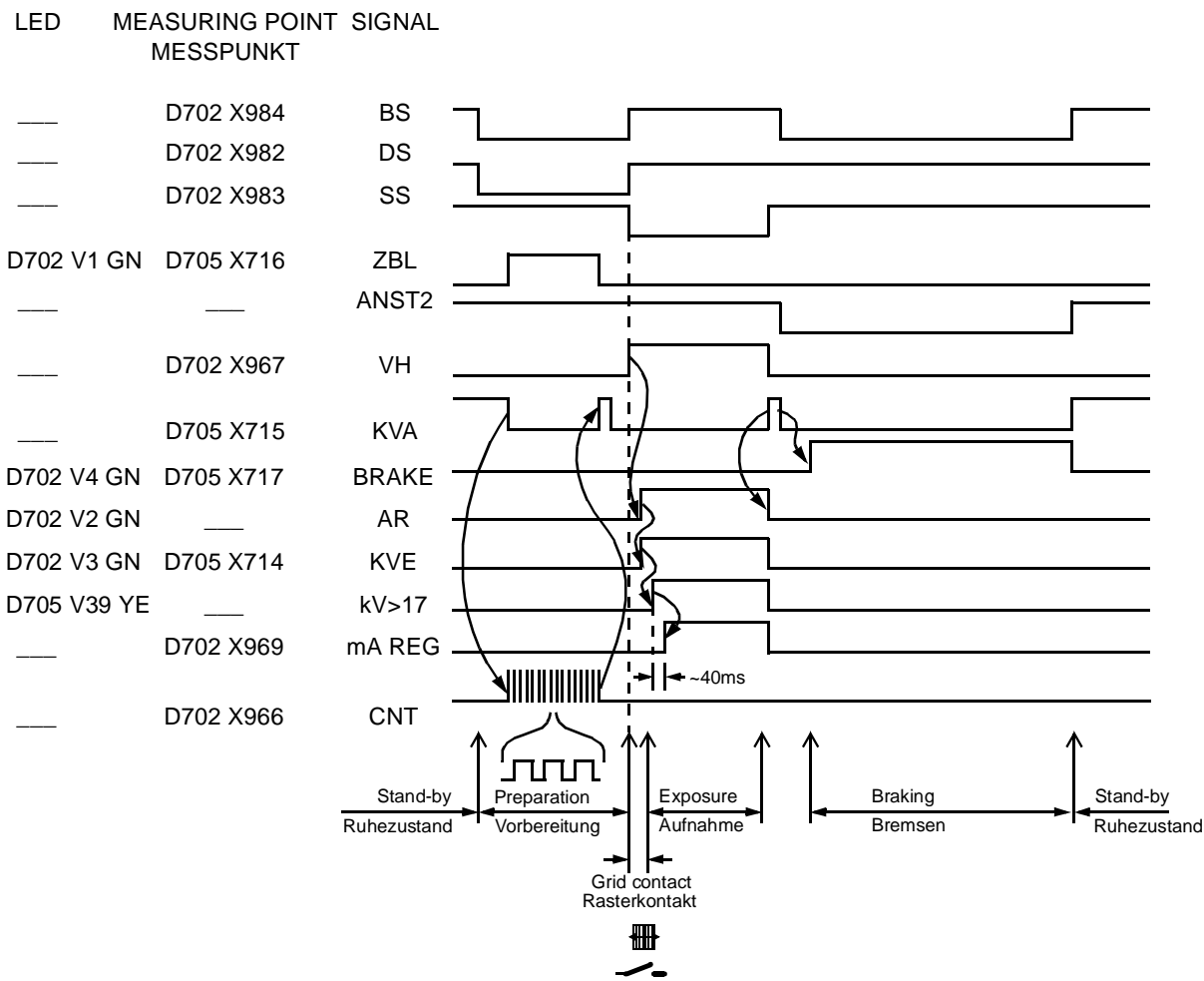
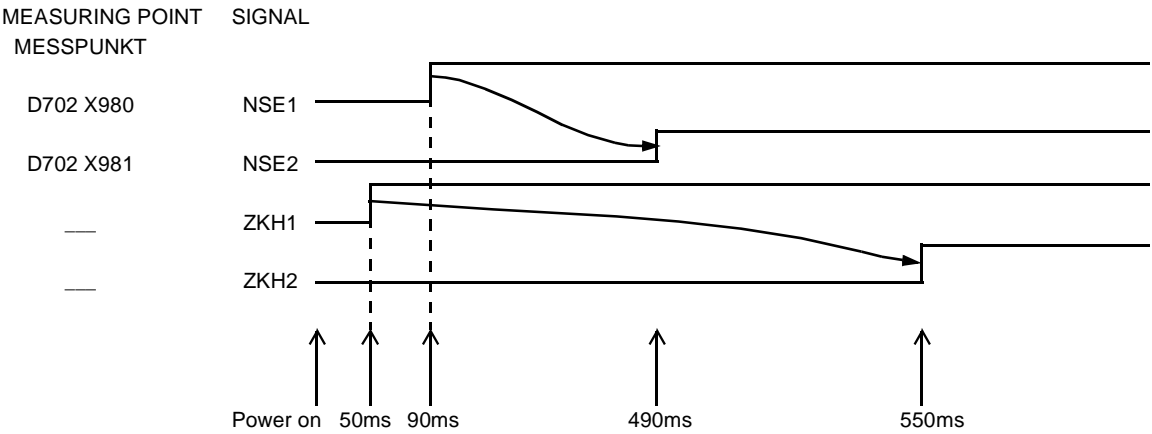
"SIGNAL_" = "SIGNAL" is active low

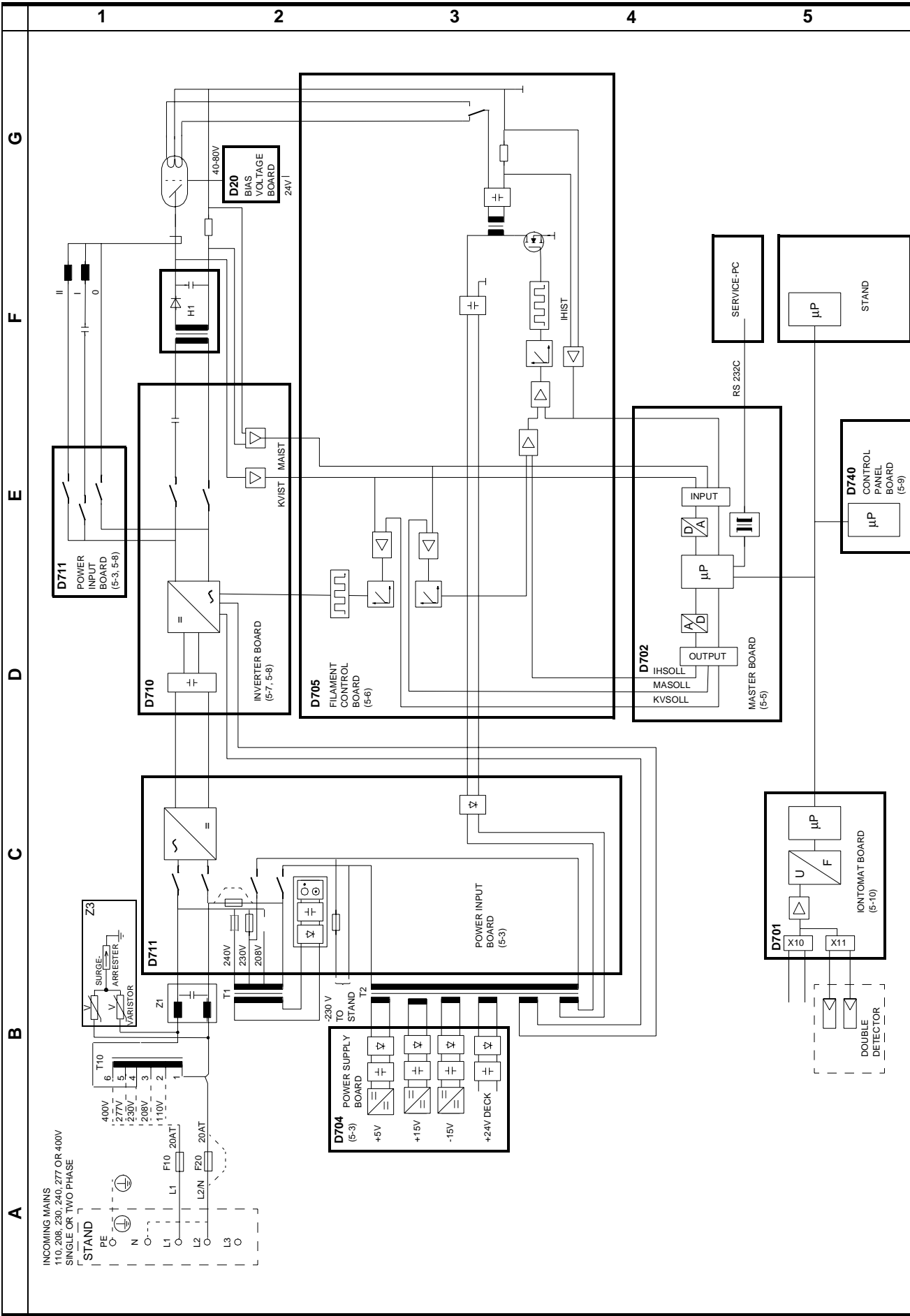
LIST OF SIGNALS AND TESTPOINTS, GENERATOR

Signal name	Explanations
TRA_1 TRA_2	Signal of the double detector to evaluate the object transparency. Is used only on board D701. (TRA_1 not used). <i>Signal von Doppeldetektor zum Ermitteln der Transparenz des Objektes. Wird nur auf der D701 Platine verarbeitet.</i>
U_ANST_	Check if +15V to control the POWER - MOS modules is present. <i>Überwachung ob +15V zum Ansteuern der POWER MOS - Module vorhanden ist.</i>
UZIST	Actual value of the inverter intermediate voltage. The LED V24 on board D710 is on at UZ>30V. <i>Ist - Wert Zwischenkreisspannung Wechselrichter. LED V24 auf D710 ist an bei UZ>30V.</i>
VH	The stand is informed that the generator has completed its preparation. <i>Dem Gerät wird mitgeteilt, daß der Generator die Vorbereitung beendet hat.</i>
WENDEL_	The filament regulator on board D705 is informed which filament is connected. From this results the limitation of IHmax to 5,8A or 8,3A. <i>Dem Heizungsregler auf D705 wird mitgeteilt welcher Heizfaden angeschlossen ist. Daraus ergibt sich die Bergrenzung von IHmax bis 5,8A oder 8,3A.</i>
WR_ANST1	Control of POWER - MOS module V1 and V4. <i>Ansteuerung POWER MOS - Module V1 und V4.</i>
WR_ANST2	Control of POWER - MOS module V2 and V3. <i>Ansteuerung POWER MOS - Module V2 und V3.</i>
WR_AUSTAST_	By exceeding of I _{max} in the inverter, the inverter control is disabled during 200ms. <i>Bei Überschreiten von I_{max} im Wechselrichter wird die Ansteuerung für 200ms unterbrochen.</i>
ZBL_	The MASTER enables the power section (e. i. inverter) to make preparation. <i>Der MASTER gibt den Leistungsteil (d. h. Wechselrichter) zu Vorbereitung frei.</i>
ZK_HEIZ1_	The relay K8 switches the filament intermediate circuit on through damping resistors. <i>Relais K8 schaltet den Heizungszwischenkreis über Dämpfungswiderstände ein.</i>
ZK_HEIZ2_	The relay K9 bypasses the damping resistors. <i>Relais K9 überbrückt die Dämpfungswiderstände.</i>

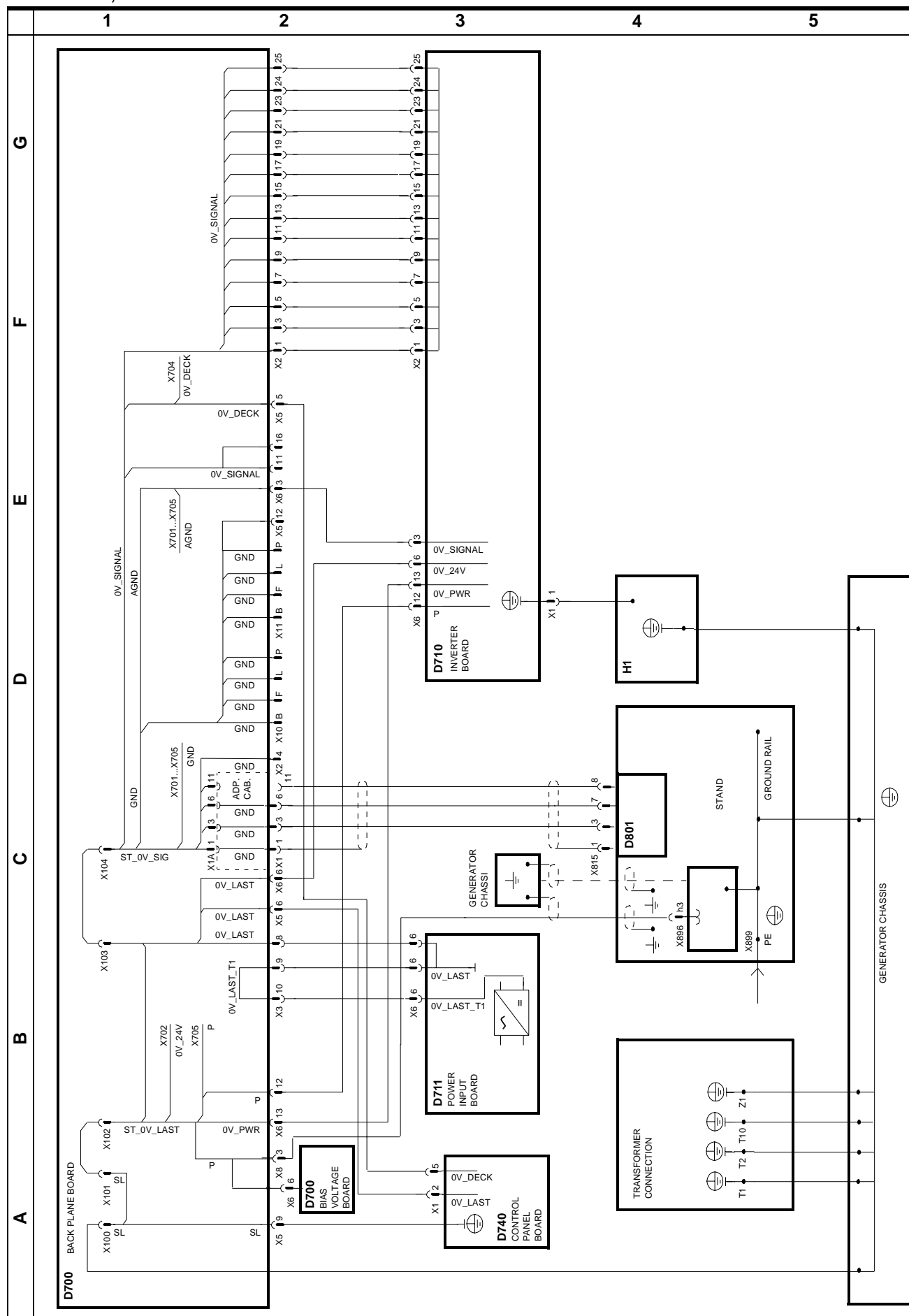
SIGNAL DIAGRAM

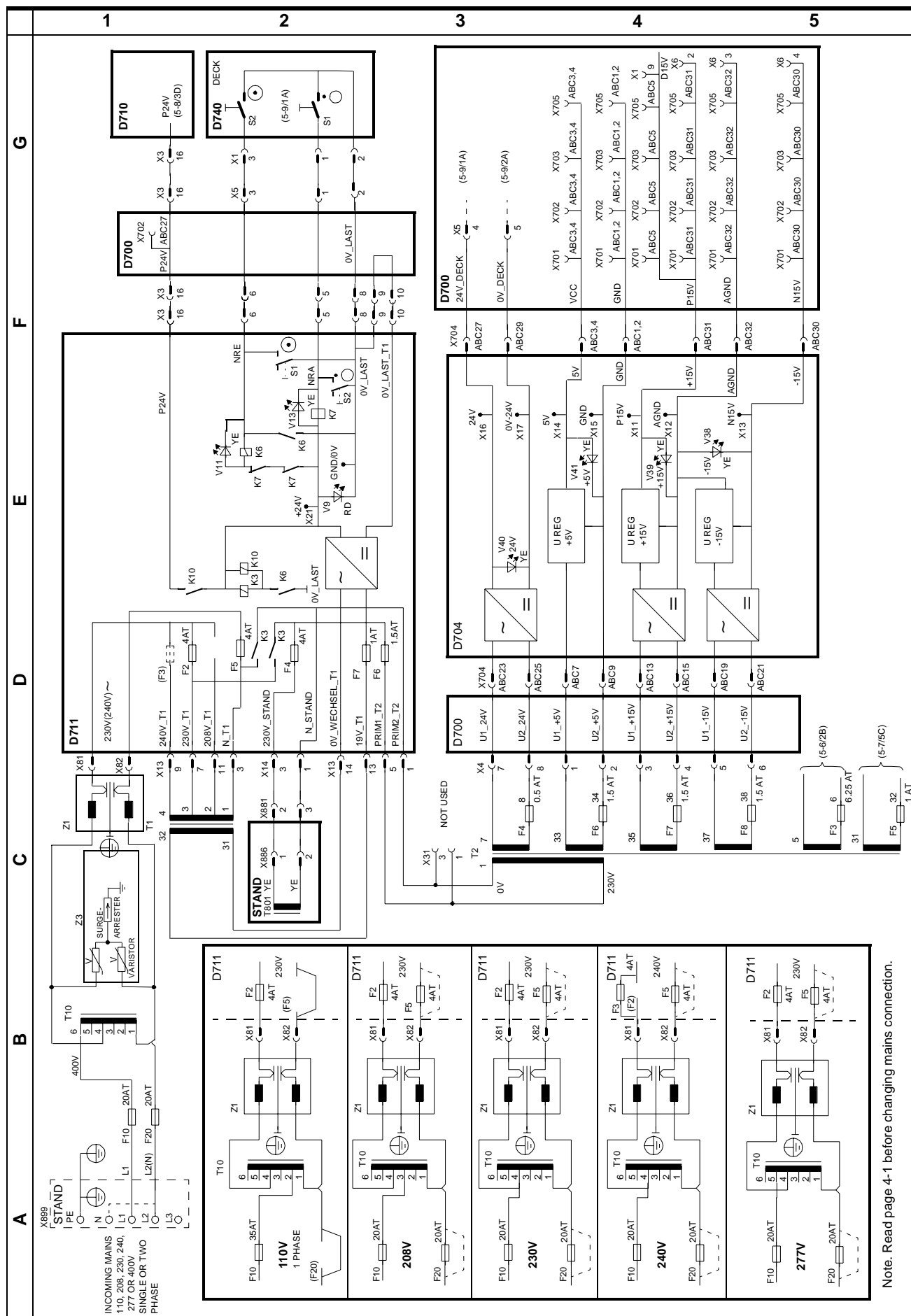
POWER-ON SEQUENCE
EINSCHALTSEQUENZ



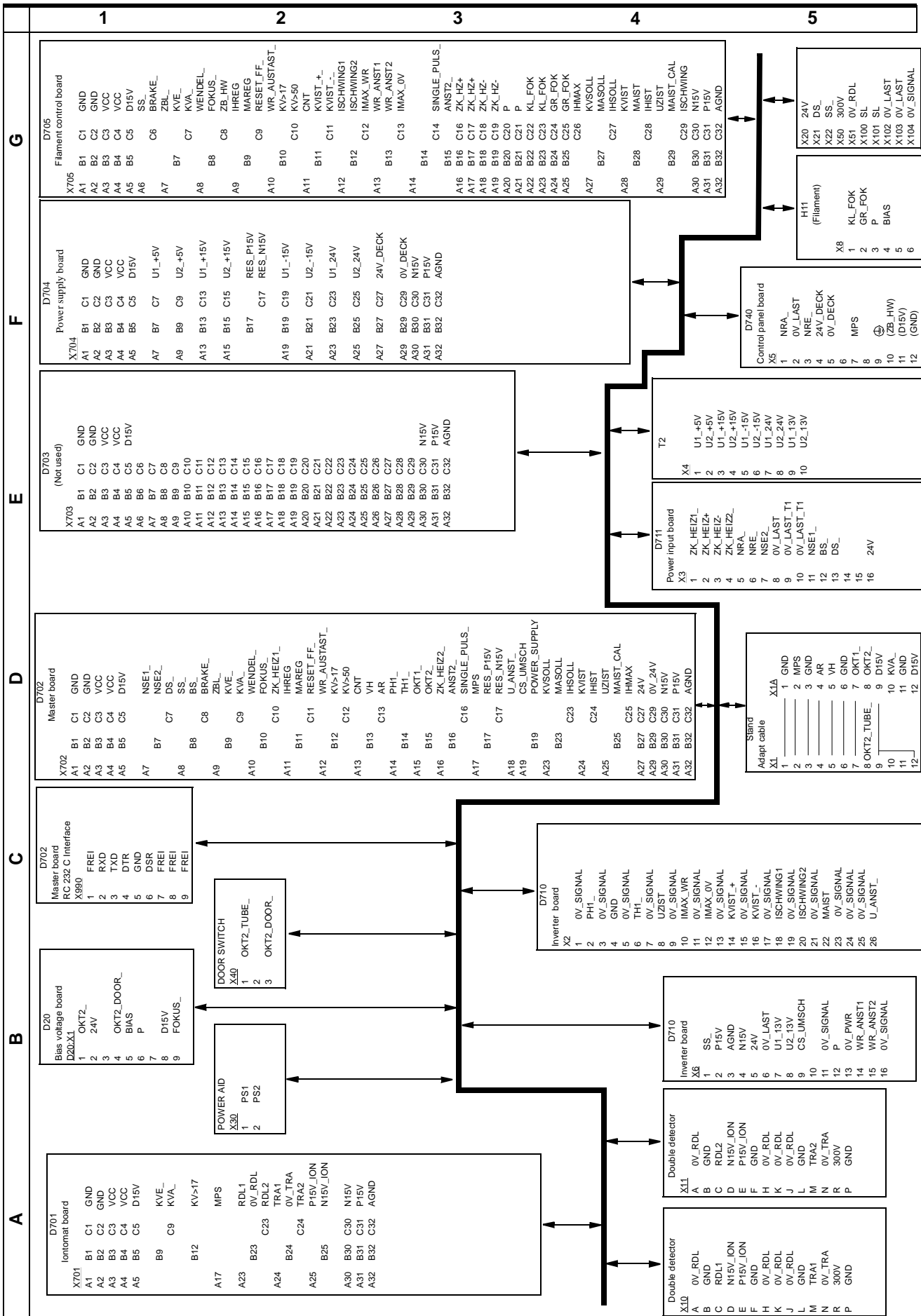


GROUND, 0V AND PROTECTION GROUND DISTRIBUTION





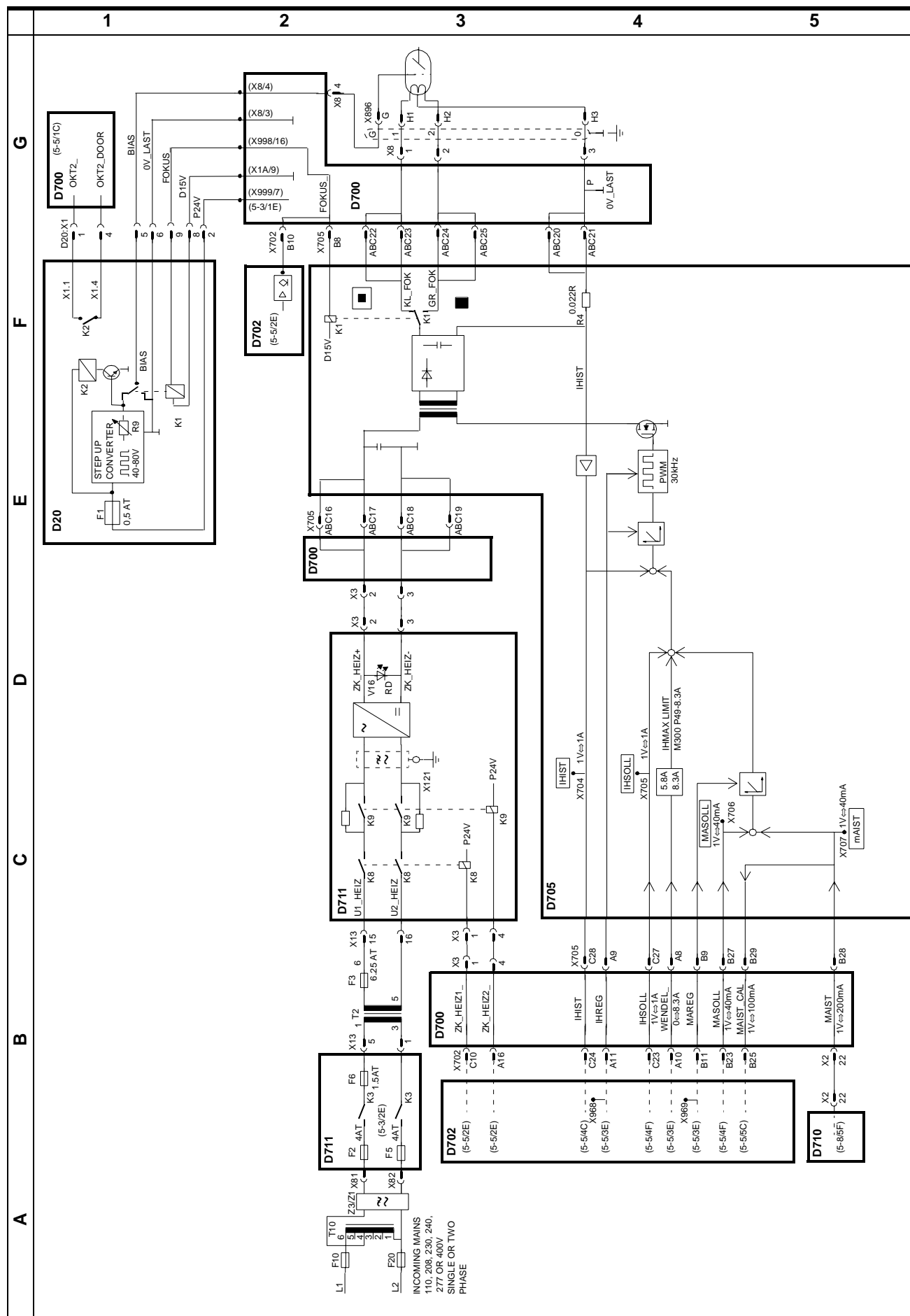
BACK PLANE D700



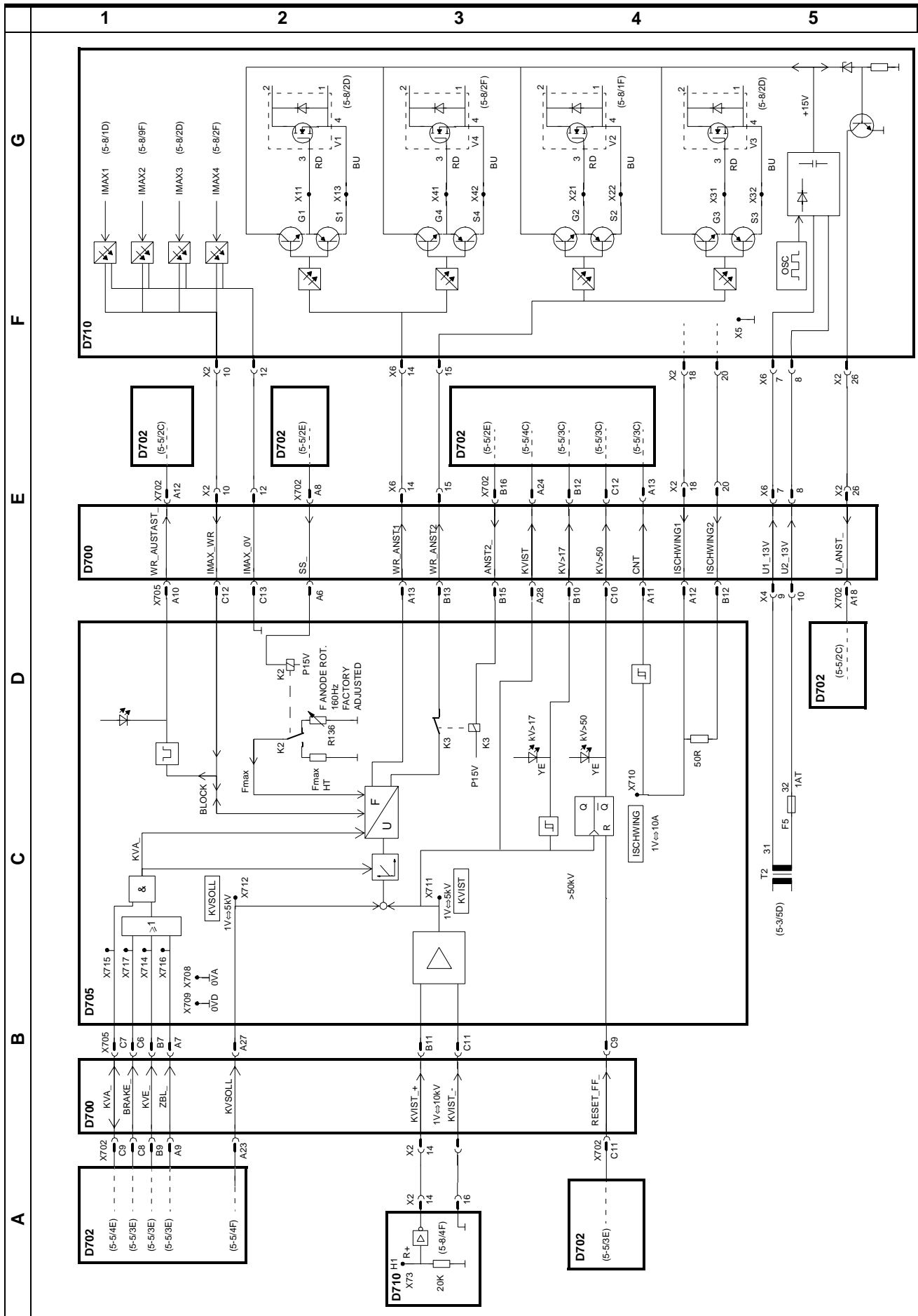
The diagram illustrates the electrical connections for a crane control system. It features a central CPU module connected to various input/output modules (D700, D701, D705, D710, D711, D740, D750) and a service PC. The CPU module includes a power supply section (PS1, PS2) and a control section (X981, X982, X984, X986, X987, X988, X989, X990, X991, X992, X993, X994, X995, X996, X997, X998, X999, X1000). The D700 module is connected to the CPU via a 20-pin cable (X101, X102) and provides power to the CPU (X981, X982, X984, X986, X987, X988, X989, X990, X991, X992, X993, X994, X995, X996, X997, X998, X999, X1000). The D701 module is connected to the CPU via a 7-pin cable (X101, X102) and provides power to the CPU (X981, X982, X984, X986, X987, X988, X989, X990, X991, X992, X993, X994, X995, X996, X997, X998, X999, X1000). The D705 module is connected to the CPU via a 7-pin cable (X101, X102) and provides power to the CPU (X981, X982, X984, X986, X987, X988, X989, X990, X991, X992, X993, X994, X995, X996, X997, X998, X999, X1000). The D710 module is connected to the CPU via a 7-pin cable (X101, X102) and provides power to the CPU (X981, X982, X984, X986, X987, X988, X989, X990, X991, X992, X993, X994, X995, X996, X997, X998, X999, X1000). The D711 module is connected to the CPU via a 7-pin cable (X101, X102) and provides power to the CPU (X981, X982, X984, X986, X987, X988, X989, X990, X991, X992, X993, X994, X995, X996, X997, X998, X999, X1000). The D740 module is connected to the CPU via a 7-pin cable (X101, X102) and provides power to the CPU (X981, X982, X984, X986, X987, X988, X989, X990, X991, X992, X993, X994, X995, X996, X997, X998, X999, X1000). The D750 module is connected to the CPU via a 7-pin cable (X101, X102) and provides power to the CPU (X981, X982, X984, X986, X987, X988, X989, X990, X991, X992, X993, X994, X995, X996, X997, X998, X999, X1000). The service PC is connected to the CPU via a 9-pin cable (X101, X102).

NOTE: POTENTIOMETERS R11, R13 AND R43 ARE FACTORY ADJUSTED

PRINCIPLE DIAGRAM, TUBE FILAMENT



PRINCIPLE DIAGRAM, INVERTER CONTROL AND KV REGULATION



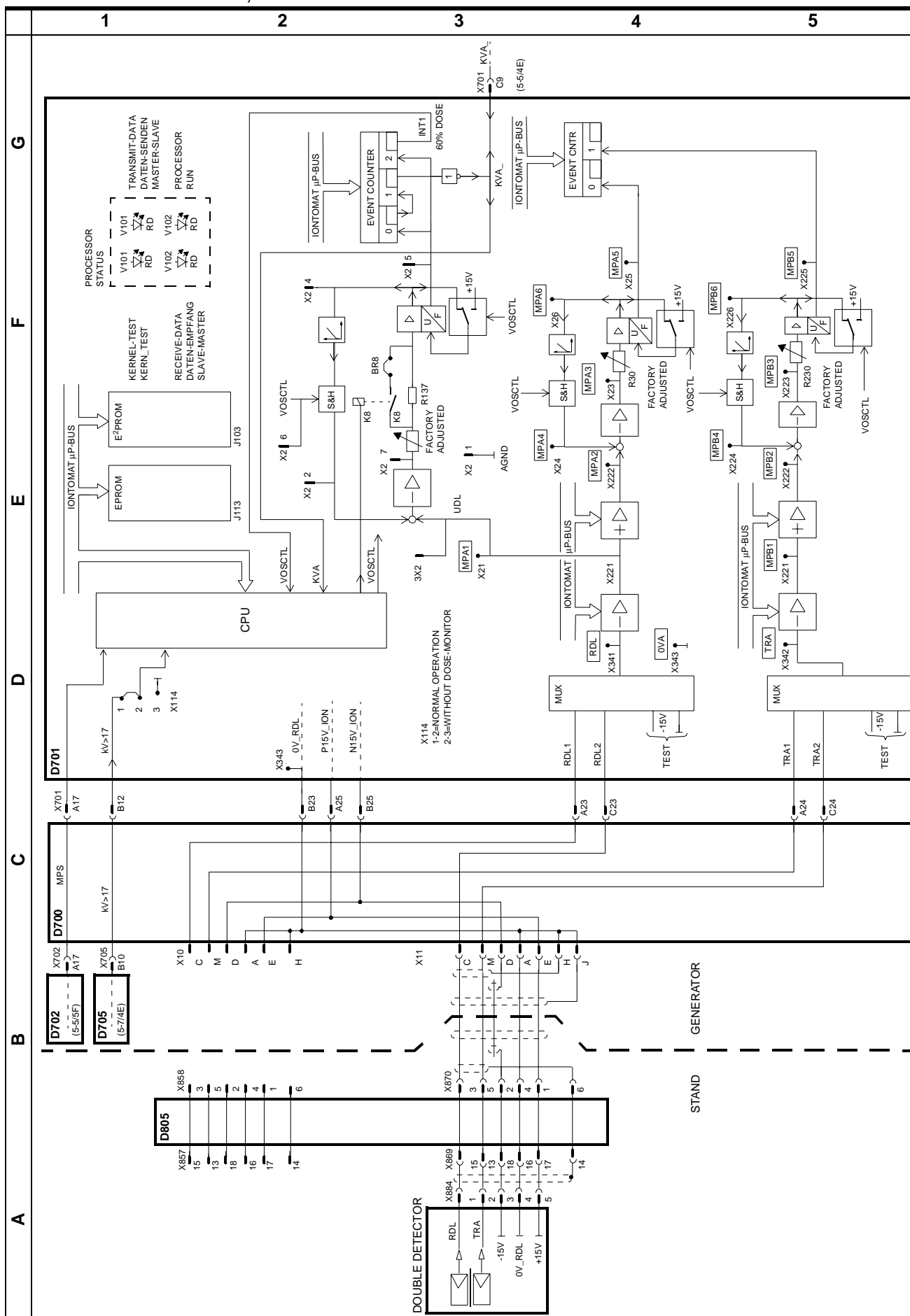
[illegible]

The schematic diagram illustrates the internal architecture of the D740 computer system, organized into five main functional blocks:

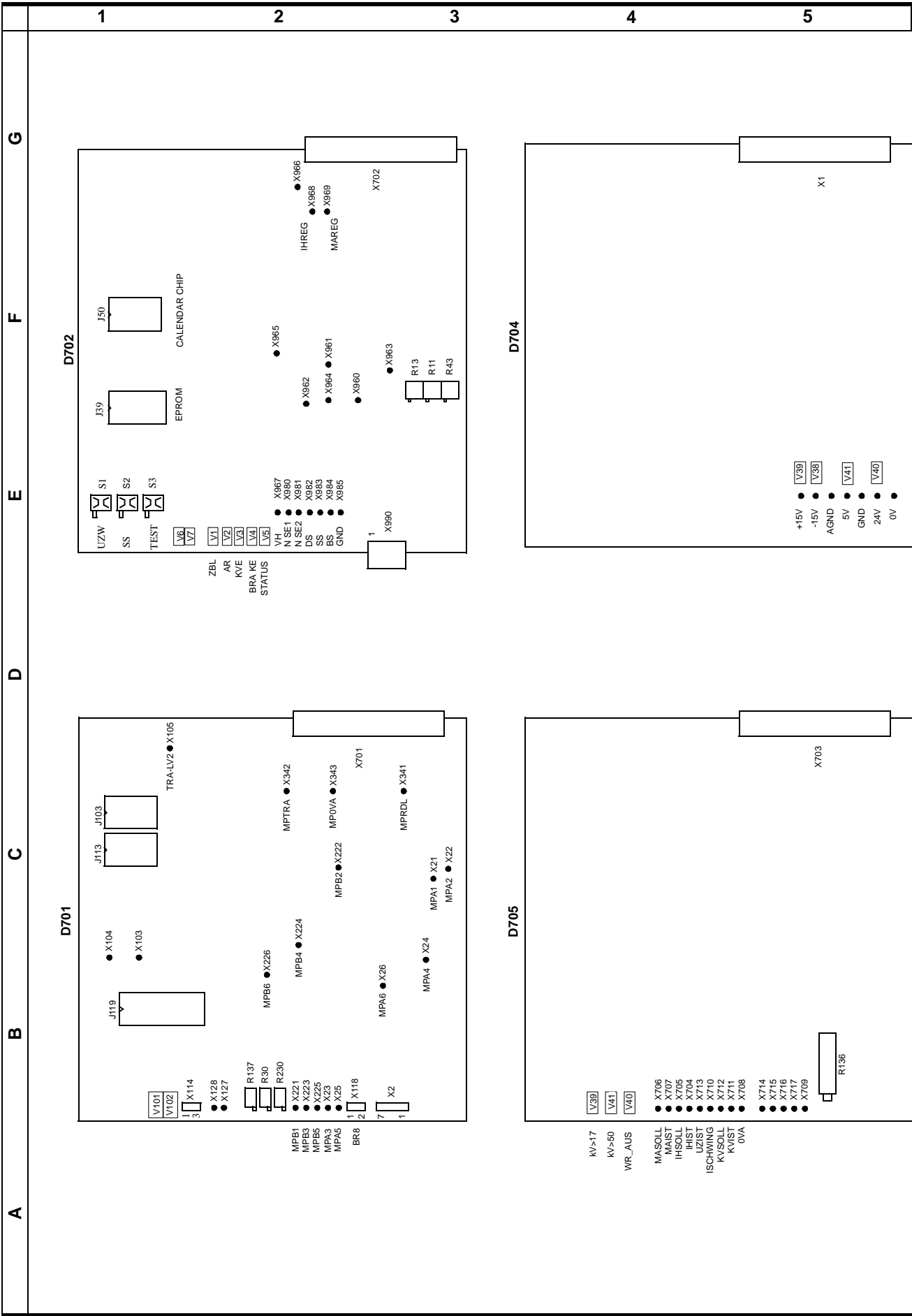
- Block 1 (Left):** Contains the CPU 8051, EPROM (32K x 8), RAM (2K x 8), and E²-PROM (2K x 8). It also shows various input/output ports (X1, X2, X3, X4, X5, X6, X7, X8, X9, X10, X11, X12, X13, X14, X15, X16, X17, X18, X19, X20, X21, X22, X23, X24, X25, X26, X27, X28, X29, X30, X31, X32, X33, X34, X35, X36, X37, X38, X39, X40, X41, X42, X43, X44, X45, X46, X47, X48, X49, X50, X51, X52, X53, X54, X55, X56, X57, X58, X59, X60, X61, X62, X63, X64, X65, X66, X67, X68, X69, X70, X71, X72, X73, X74, X75, X76, X77, X78, X79, X80, X81, X82, X83, X84, X85, X86, X87, X88, X89, X90, X91, X92, X93, X94, X95, X96, X97, X98, X99, X100) and a +5V UREG.
- Block 2 (Middle):** Shows the CPU 8051 connected to the EPROM, RAM, and E²-PROM. It also includes a +5V UREG and a +24V DECK.
- Block 3 (Right):** Features the CPU 8051 connected to the EPROM, RAM, and E²-PROM. It also includes a +5V UREG and a +24V DECK.
- Block 4 (Bottom):** Displays the CPU 8051 connected to the EPROM, RAM, and E²-PROM. It also includes a +5V UREG and a +24V DECK.
- Block 5 (Top):** Shows the CPU 8051 connected to the EPROM, RAM, and E²-PROM. It also includes a +5V UREG and a +24V DECK.

The diagram also includes a detailed view of the CPU 8051 pin connections, showing the CPU, EPROM, RAM, and E²-PROM. It also shows the +5V UREG and +24V DECK. The CPU 8051 is connected to the EPROM, RAM, and E²-PROM. The +5V UREG is connected to the CPU 8051. The +24V DECK is connected to the CPU 8051.

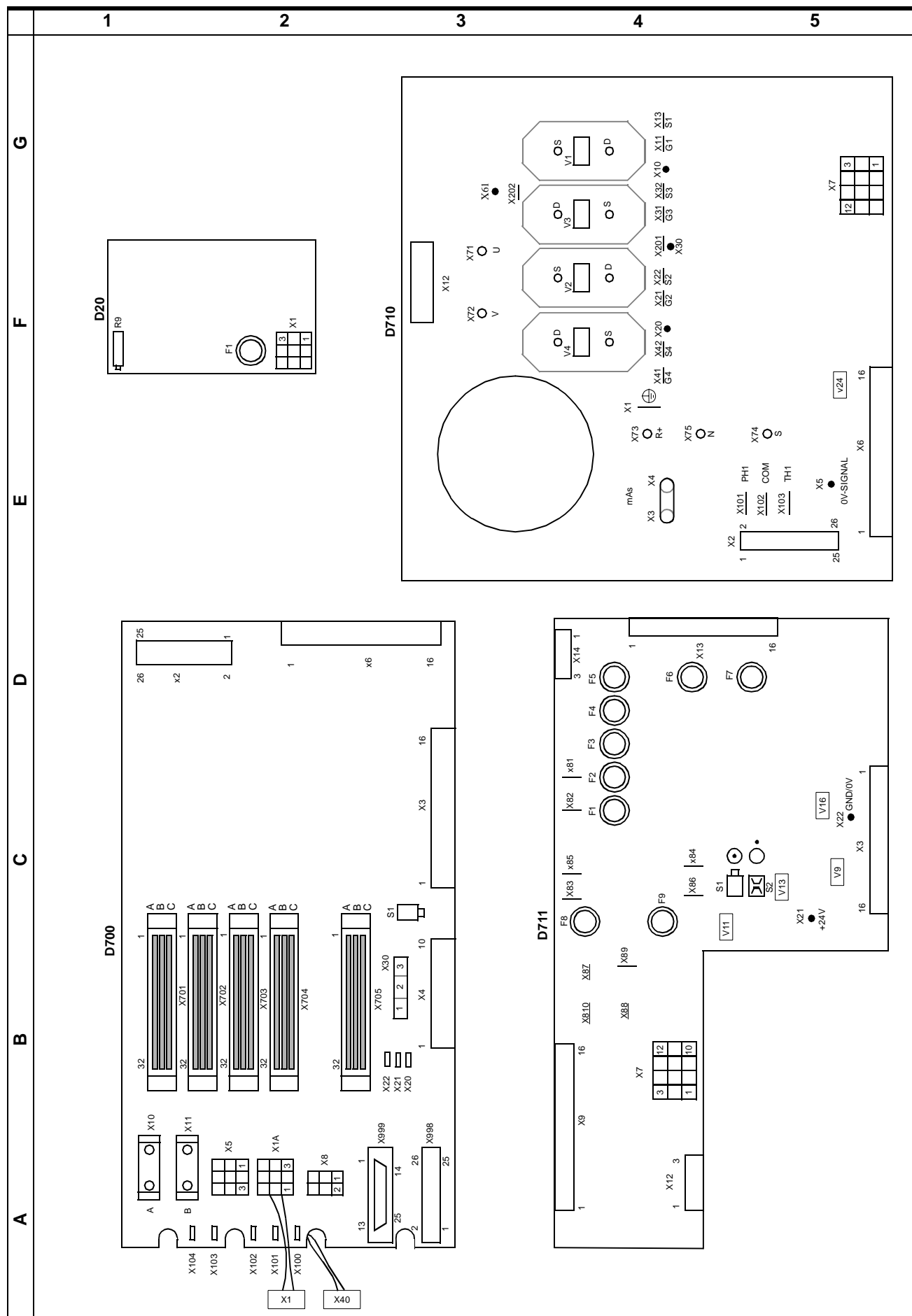
PRINCIPLE DIAGRAM, IONTOMAT



CONTACT LOCATION



CONTACT LOCATION



STAND

Designation	Part no.	Revision no. of document															
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
D801	61 67 683 X041E	X	X	X	X	X	X										
D802	61 67 667 X041E	X	X	X	X	X	X										
D803	61 08 224 X041E	X	X	X	X	X	X										
D804	61 08 281 X041E	X	X	X	X	X	X										
D805	61 67 725 X041E	X	X	X	X	X	X										
D806	61 08 455 X041E	X	X	X	X	X	X										
D807	61 07 881 X041E	X	X	X	X	X	X										
D808	61 67 857 X041E	X	X	X	X	X	X										
Software Stand	62 69 158 X041E	X	X	X	X	X	X										
Double detector	37 73 988 X1773	X	X	X	X	X	–										
Double detector	38 47 626 X1773	0	0	0	0	0	X										

X = Beginning of delivery

0 = Subsequent installation possible

COMPATIBILITY LIST

GENERATOR

Designation	Part no.	Revision no. of document															
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
D20	61 97 755 X041E	X	X	X	X	X	X										
D700	61 97 862 X041E	X	X	X	X	X	X										
D701	11 64 198 X2059	X	X	X	X	X	–										
D701	38 47 634 X2059	0	0	0	0	0	X										
D702	11 64 214 X2059	X	X	X	X	X	X										
D704	11 09 888 X2059	X	X	X	X	X	X										
D705	11 64 230 X2059	X	X	X	X	X	X										
D710	86 11 154 X2051	X	X	X	X	X	X										
D711	11 64 255 X2059	X	X	X	X	X	X										
D740	61 97 763 X041E	X	X	X	X	X	X										
Software Gen	61 67 261 X041E	X	X	X	X	X	–										
Software Gen	63 14 806 X041E	0	0	0	0	0	X										

X = Beginning of delivery

0 = Subsequent installation possible